JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

EDITED BY

THE COMMITTEE OF PAPERS.

VOL. VII.

PART I.—JANUARY 1849 TO DECEMBER, 1850.

ORIGINAL COMMUNICATIONS.

" A body of men engaged in the same pursuit, form a joint stock of their information and experience, and thereby put every individual in possession of the sum total acquired by them all."—REV. DR. WILLIAM CAREY.

Calcutta:

BISHOP'S COLLEGE PRESS.

M.DCCC.L.

Contents

OF PART I, VOLUME VII.

No. 1.

No. 2.

Index

TO PART I, VOLUME VII.

INDEX TO NAMES OF CONTRIBUTORS

TO PART I, VOLUME VII.

JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

EDITED BY

THE COMMITTEE OF PAPERS.

VOL. VII.

PART II.—JANUARY 1849 TO DECEMBER, 1850.

CORRESPONDENCE AND SELECTIONS.

Calcutta:

BISHOP'S COLLEGE PRESS.

M.DCCC.L.

Contents

OF PART II, VOLUME VII.

No. 1.

Index

TO PART II, VOLUME VII.

THE JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

An account of a peculiar mode of cultivating Sugar-cane without irrigation, as adopted in some villages in the Agra Zillah.

[Communicated by the Government, N. W P.]

No. 1928 of 1849.

FROM J. THORNTON, ESQUIRE,
Secretary to Government, N. W. Provinces,

TO *Secretary Agricultural and Horticultural Society, Calcutta.*

DATED HEAD-QUARTERS: *the 4th June,* 1849.

Revenue Dept. } SIR,—I am directed to transmit to you the accompanying copy of a letter No. 11, dated 14th ultimo, from the Commissioner of the Agra Division, with its enclosures, giving an account of a method of cultivating Sugar-cane without

irrigation. The above is transmitted for such notice as the Agricultural and Horticultural Society may think the subject deserves.

I am, Sir,
Your obedient humble Servant,
J. THORNTON,
Secretary to Government, N. W. P.

COPIES.

No. 11 of 1849.

FROM F. H. ROBINSON, ESQUIRE,
Commissioner, Agra Division,

TO J. THORNTON, ESQUIRE,
Secretary to Government, N. W. Provinces.

DATED AGRA: *the 14th May,* 1849.

SIR,—In the course of my tour last cold season, I ascertained that in some villages of pergunnah Pinnahut, zillah Agra, a peculiar mode of cultivating sugar-cane without irrigation existed in lands where the *termes* or white-ant abounds.

2nd. I thought it worth while to apply to the Collector for an account of this singular process of cultivation, and now submit it to Government.

3rd. Perhaps it may be, with advantage, communicated to the Agricultural Society.

I have the honor to be, &c.,
(Signed) FRANCIS ROBINSON,
Commissioner.

COMMR.'S OFFICE, AGRA DIVISION:
The 14th May, 1849.

No. 143 of 1849.

FROM C. C. JACKSON, ESQUIRE,
Collector of Agra,

TO F. H. ROBINSON, ESQUIRE,
Commissioner of Revenue, Agra.

DATED AGRA: *the 8th May,* 1849.

SIR,—With reference to your letter of the 12th February last, No. 39, I have the honor to forward for your information a statement showing the process of cultivating sugar-cane in pergunnah Pinnahut, without irrigation, together with the expense and value of the returns.

I have the honor to be, &c.,

(Signed) C. C. JACKSON,
Collector.

ZILLAH AGRA, COLLECTOR'S OFFICE:
The 8th May, 1849.

Statement showing the quantity of Land cultivated with

No.	Name of Mouzah in which Sugar-cane is cultivated without irrigation.	Quantity of land.		Expenditure. Rent of two years.			Quantity of seed per Beegah.			Expence of sowing Sugar-cane and of expressing out the juice, and other expences attending it.				Total expenditure per Beegah.		
		Big.	Bis.													
1	Umhaie, ..	11	12	6	0	0	3	0	0	Pal, ...	1	8	0	31	11	0
										Digging Ditch, ..	3	0	0			
										Laborers for weeding,	0	12	0			
										Wood for mill, ..	1	0	0			
										Carpenters for making ditto, ...	1	1	6			
										2 Laborers for burning the furnace for 9 days, ...	1	4	0			
										Peindia for making 54 *kurhais* of *goor*, each weighing 15 seers, for his labor he is entitled to 41 seers of goor, valued at ..	3	1	6			
										3 Laborers for cutting sugar-cane in pieces, making *goor*, and driving the mill, ..	2	6	6			
										9 Laborers for cutting sugar-cane from the field for 9 days, ..	7	9	6			
											22	11	0			
2	Bhojpoorah,	1	16	6	0	0	3	0	0	Ditto, ...	22	11	0	31	11	0
3	Paharpoorah,	2	10	6	0	0	3	0	0	Ditto, ...	22	11	0	31	11	0
4	Pyraumpoorah, ..	2	0	6	0	0	3	0	0	Ditto, ...	22	11	0	31	11	0
5	Jaitpore, ..	30	9	6	0	0	3	0	0	Ditto, ...	22	11	0	31	11	0
6	Deopoorah, ..	12	6	6	0	0	3	0	0	Ditto, ...	22	11	0	31	11	0
7	Raipoorah, Dechuth, ..	9	14	6	0	0	3	0	0	Ditto, ...	22	11	0	31	11	0
8	Sujvaiepoorah, ..	2	10	6	0	0	3	0	0	Ditto, ...	22	11	0	31	11	0
9	Keelpoorah,	4	18	6	0	0	3	0	0	Ditto, ...	22	11	0	31	11	0
10	Karunpoorah,	14	0	6	0	0	3	0	0	Ditto, ...	22	11	0	31	11	0
11	Karunpooree,	10	11	6	0	0	3	0	0	Ditto, ...	22	11	0	31	11	0
12	Mhowa, ..	5	14	6	0	0	3	0	0	Ditto, ...	22	11	0	31	11	0
13	Bithowny, ..	1	2	6	0	0	3	0	0	Ditto, ...	22	11	0	31	11	0
	Total, ..	109	2	0	0	0	0	0	0	.. ..		0	0	0	0	0

Sugar-cane without irrigation, in Pergunnah Pinnahut.

Total expenditure of land cultivation.			Produce. Average produce of goor per Beegah.		Average price of do. do.			Total produce of cultivated land.		Total value of produce.			Profit to *assamee* per Beegah after paying all expences.		
			Bgs.	Bis.				Mds.	Srs.						
367	9	3	20	10	60	12	0	234	36	704	11	9	29	1	0
57	0	6	20	10	60	12	0	36	18	109	5	6	29	1	0
79	3	6	20	10	60	12	0	50	25	151	12	0	29	1	0
63	6	0	20	10	60	12	0	40	20	121	8	0	29	1	0
964	14	0	20	10	60	12	0	616	24½	1849	13	3	29	1	0
389	12	0	20	10	60	12	0	249	3	747	3	9	29	1	0
307	5	9	20	10	60	12	0	196	17	589	4	6	29	1	0
79	3	6	20	10	60	12	0	50	25	151	14	0	29	1	0
155	4	3	20	10	60	12	0	99	9	297	10	9	20	1	0
443	10	0	20	10	60	12	0	283	20	850	8	0	29	1	0
334	5	0	20	10	60	12	0	213	25½	640	14	0	29	1	0
180	10	3	20	10	60	12	0	115	17	346	4	3	29	1	0
34	13	9	20	10	60	12	0	22	11	66	13	3	29	1	0
3457	1	9	..	..	0	0	0	2209	11	6627	13	0	0	0	0

Remarks.

Sandy soils are selected for sugar-cane, because the soil is naturally soft, and when enriched by manure and pulverised by continued ploughing, the plant germinates in them with greater readiness: should however the soil be hard, the plant will not take root, and is speedily dried up. *Retar* lands are consequently selected for cane cultivation in preference to *Chikna,* the former is said to be also less affected by the heat of the sun, whilst *Chikna* lands generally crack, and the fibrous roots of the plant being broken, it soon withers.

The *assamees* commence the cultivation of cane without irrigation in the month of *Jet* or *Assur* [middle of May to middle of July] by spreading manure; the land is ploughed four times in each month, from *Sowan* to *Koar* [middle of July to middle of October], and after the conclusion of the rains, or from *Kartick* to *Magh* [from 15th October to early part of February], the fields are ploughed twice in each month; the entire number of ploughings averaging about twenty. Should circumstances prevent ploughing during the wet months, the soil becomes hard and unfit for planting, but if ploughing is continued as above described, the soil derives due benefit from the manure that has been laid on it. The plant is set in the ground during the middle of *Phagoon* (end of February) in the following manner. Each cane is divided into five pieces, 210 pieces are made into a *poolah* or bundle, and 48 of these are used in planting one beegah. After the plant is set in the ground a wall of three cubits height is made and a ditch dug round the field for its protection. When the plant sprouts, the *assamees* gather *Bajra,* [*Holcus spicatus,* L.] *Kurbee,* [*Holcus sorghum,* L.] stocks of *Bun* and *Arhur,* [*Cytisus Cajan,* L.] and dried leaves of trees, &c., which they call *Pal,* and cover up the plants with it, which continue in that state during the hot season. The natives assign two reasons for this process, first, that it prevents the heat from injuring the plants, and secondly, that it preserves it from white-ants, which attack in preference the *Kurb,* &c. whilst the deposit of slimy mud which they leave helps to keep the plant moist. At the commencement of the rainy season the *Kurb,* &c. is removed, and the roots dug round with the *phaorah.* Should rain fall in abundance dur-

ing the two years that the process is carried on, the produce of *goor* will be at the rate of 27 maunds per beegah, but if during the first year of ploughing rain be scanty, and in the second year plentiful, the produce per beegah will fall off to 20½ maunds. On the contrary, if during the first, rain is abundant, and during the second, scarce, the yield of *goor* averages 13½ mds. per beegah: but should the rains fail in both seasons, a total failure of the crops ensues, a fear of which prevents a more extensive cultivation of cane by this process.

The statement shows 20 maunds and 10 seers as the average produce per beegah, which at the rate of 3 Rs. per maund will give 60 Rs. 12 Annas as the average gross proceeds per beegah. The expenses are, 6 Rs. rent for 2 years, 3 Rs. price of cane for planting, and Rs. 22-11-0 on account of other expenses, as indicated in the statement, making a total expenditure of Rs. 31-11, and leaving a profit of Rs. 29-1-0 per beegah.

(Signed) C. C. JACKSON, *Collector.*

(True Copies.)

COLLECTOR'S OFFICE: H. THORNHILL,

ZILLAH AGRA, *Offg. Asst. Secy. to the Govt., N.W.P.*

The 8th May, 1849.

Report on Coffee raised in the Government Plantation at Kishenpore, Chota Nagpore.

In 1843, Lieutenant Colonel J. R. Ouseley, Agent to the Governor General on the S. W. Frontier, submitted to the Government of Bengal,—with reference to a very satisfactory report he had received from Messrs. Wilson, Ritchie and Co., of Colombo, on a quantity of coffee raised in his garden at Burkaghur, in Chota Nagpore, from Mocha stock, originally obtained from the H. C. Botanic Garden, Calcutta,—the propriety of establishing a small experimental garden at Kishenpore, in the same district, for the culture of the plant on a more extended scale. The matter was referred to Mr. Griffith, then Officiating Superintendent of the Botanic Garden, who reported so favorably on it, being of opinion,

that "the circumstances connected with the soil, climate, and mode of culture, appeared so promising as to warrant the expectation of success"—that the Government agreed to the proposal, and a small plantation of eleven acres was formed accordingly.—(V. Journal Agri-Horticultural Society, Vol. iv. page 76, Appendix.)

In February 1846, Colonel Ouseley forwarded to the Society a few seers of coffee, raised in his garden from trees of 7 and 4 years old. It was so favorably thought of by a member who has considerable knowledge of the article, and who deemed that "these specimens only required age to rank them with superior Mochas in flavor and appearance,"—that the Society was induced to send them home for the particular opinion of experienced dealers in London, whose reports, it will be seen, very closely accord with that previously given.*—(Journal Vol. v. pp. 17 and 139, Appendix.)

These reports were submitted by Colonel Ouseley to the Government of Bengal, who, about the same time, authorized the extension of the experimental plantation to 42 acres, "so as to establish a certain and unfailing supply of plants for the people of the country." The whole of this land is now laid out with seedlings from Colonel Ouseley's own garden. (See Journal, Vol. v. p. 159, where will also be found some useful information regarding the capabilities of Chota Nagpore for the production of this staple, in the form of replies by Colonel Ouseley, to certain queries of a Ceylon planter.)

* Messrs. Trueman and Cook describe this coffee as "fine, ordinary, coloring, green, mixed with a few pale and unripe berries; flavor delicate, and the berry well made, and similar to Mocha; value, if imported at the low duty, that is, with certificate, 56 to 58 per cwt. in bond." Messrs. John and Henry Taylor consider "it worth about 54 per cwt. in bond, supposing it subject to the duty of 4*d.* per lb. This we consider the present worth of it by itself; but as it so much resembles Mocha coffee, especially when roasted, the trade would probably buy it for mixing, and in this case a few shillings more might be obtained."

In June 1848, a second batch of coffee, the produce of his own garden, was submitted by Colonel Ouseley. This was considered by the Society's Committee "equally as good, if not superior, to the first specimen, in the even size of the berry, and in its general healthy and plump appearance."

It only remains to add, as introductory to the following report and memoranda, that Colonel Ouseley has lately forwarded to Government a larger quantity (about 9 maunds) of the berry, the produce of the above named experimental garden, and which has been referred to the Society for opinion. As these memoranda, for which the Society is indebted to an old, zealous, and experienced member, contain, in addition to his opinion on the article itself, several other valuable details connected with the plant, likely, it is conceived, to prove useful to parties engaged in the culture, the Committee of Papers have much pleasure in publishing it in this place for general information, together with the communication submitted by Mr. T. M. Robinson.

To JAMES HUME, ESQ., *Honorary Secy. Agri-Horticultural Society.*

SIR,—We beg to acknowledge receipt of your letter of the 16th March, accompanied by a sample of coffee grown in the Govt. plantation of Kishenpore, in Chota Nagpore, on the quality and value of which, as compared with Mocha, Ceylon, and Jamaica, you desire our opinion; and of your's of the 16th instant, requesting to have an answer as soon as convenient.

We regret that unavoidable circumstances have prevented our giving an opinion earlier, and which, after all, from the slight knowledge we have of any other coffee than that of Mocha of the Calcutta bazar, may prove, we fear, of little value.

We therefore give our opinion with diffidence.

We believe that this sample of Chota Nagpore coffee, gathered as we are told in January last, from plants only 4

years old, and sent to Calcutta in February, is much too fresh, and new for use, and that if to be compared, *in use*, with the old Mocha annually imported into Calcutta, it should have been at least a year old, and kept where it was grown, rather than here.

But of all the coffee grown within this Presidency that we have seen, this sample from Chota Nagpore is the best in appearance. The berries are good, bold, heavy, of a fine greenish color, resembling Mocha,—but as compared with old Mocha, greatly deficient in fragrance, and when prepared for use, yielding (at present) a beverage of very inferior flavor and strength.

Doubtless age, in a suitable climate, will improve it for use, but in what degree, we are quite unable to state.

Supposing the Ceylon plantation coffee in bond to sell from 38*s*. to 80*s*. in London, the Chota Nagpore coffee as per sample, paying 4*d*. per ℔. duty, would not, we should think, bring less than 50*s*. to 55*s*. per cwt. in bond.*

The value of the coffee here would perhaps chiefly depend upon its worth in London. A gross price of 50*s*. per cwt. in London, with freight at £ 5-10 per ton of 20 cwt. and exchange at 2*s*. per Rupee, would leave about 14 Rs. 8 As. per bazar maund to the exporter, to cover prime cost, export duty, and shipping charges, and at 55*s*. in bond, about 16 Rs. 4 As. per bazar maund.

The Mocha of the Calcutta bazar sells generally from 14 Rs. to 18 Rs., sometimes at 20 Rs. per bazar maund, but latterly, we believe, sales have been made at 13 Rs. to 15 Rs. per maund.

Of Jamaica coffee, the best of which seems to bear the highest price in England, we are, from inexperience, unable to give an opinion.

* Ceylon coffee pays 4*d*. per ℔. duty, Mocha we believe, double duty.

We would suggest, that the nine maunds, like the sample received from the Kishenpore Government Plantation, be sent, carefully packed in mats and gunnies, and carefully shipped with the least delay possible, to London.*

Though the quantity is small, it is quite sufficient to enable brokers and dealers to form a correct opinion of its quality and value; the coffee too will improve on the voyage, and also in England, whereas, if kept in Calcutta, it would, we fear, deteriorate in strength and flavor.

Seeing how well the climate and soil of Chota Nagpore are adapted to the growth of coffee, we would further suggest that the A. and H. Society endeavour to obtain from the best Jamaica and Ceylon plantations, and also from Java, some of the finest coffee seed or seedling plants, with a view of their being tried in the above district.

We remain, Sir, your's faithfully,

CALCUTTA: *April 24th,* 1849. WILLIS & EARLE.

P. S.—Since the above was written, having referred to Vol. iv. part 2 of your Journal—we were glad to find, under the head of Correspondence and Selections, Art. 2 page 76, &c. a letter from Messrs. Wilson, Ritchie and Co., Colombo, dated 28th April 1843—reporting upon a sample of coffee grown in Col. Ouseley's garden at Burkaghur, which, as briefly affording valuable and important testimony in favor of coffee, which we presume to be similar to the muster on which we have above reported, we quote in full as under.

" We consider the sample of Col. Ouseley's garden grown " coffee as good as any of the plantation coffee shipping from " this—the value in London market, by last advices, being " from 85*s*. to 90*s*. per cwt., had the parchment been cleaned " properly off the berry. We must look for much lower

* This suggestion has been acted on by the Government of Bengal.—EDS.

"prices when all the plantations now under cultivation have "come into bearing.

"The yield of good plantations here may be reckoned at "from 12 to 17 cwt. per acre: some patches have given 18 "cwt. of such coffee as your sample."

No. 1.

Memoranda on samples of Coffee, the growth of Chota Nagpore. By T. F. HENLEY, ESQ.

The sample of coffee submitted to me, marked *C*, is remarkably fine and unexceptionable. The grain small, hard, and heavy, with a considerable admixture of pea berry, and having the bluish-green bloom, so much admired in the choicest samples of Jamaica, Ceylon, and other Colonial coffees.

It would be desirable to have a quantity of the fruit sent down, either dried with the pulp or the latter separated to the parchment, for the sample to represent the article in bulk, as actually collected from the trees, so as to enable the Society to form an opinion of the quantity and quality of the triage. The age of the trees, and produce of some given area, should also be stated. If the sample now submitted be but a picked specimen, no valuable conclusion could be come to on the subject, in an economical point of view, as many fair samples may be obtained grown in the neighbourhood of Calcutta itself, where we know that the requisite conditions for the profitable culture of the berry do not exist. The perfection and weight of the grain, and general excellence of the Nagpore coffee, augur most favorably of the suitability of that locality for the cultivation.

From my own knowledge of coffee cultivation, both in Ceylon and Mauritius, it has always been a subject of surprise that Bengal should be an importing, instead of exporting country of the staple in question, particularly as the culture is so simple and well suited to native industry. Almost all the "native coffee," as it is termed, of Ceylon,

is the produce of the little patches of ground surrounding the native huts, intermixed with their plantain and fruit trees, and seldom numbering 100 plants, and rarely to be found in any thing resembling a regular plantation. To keep away the birds seems to be the only culture it receives, and to this the children and women attend.

There can be no doubt but that whole regions exist within moderate distances of Calcutta on which all the requisites for the successful cultivation of the plant are to be found. On the Sylhet side, the Assam valley, all along the bases of the Carrabam hills, &c. &c.

I believe it to be an error, very generally current, that coffee requires elevated situations. It is, on the contrary, a hardy plant, which will thrive almost anywhere in or near the tropics when it finds suitable conditions, which are, a deep and thoroughly well-drained and dry bottom, a fertile soil, partial shade and shelter, and a showery climate. In Mauritius it may be found in greater luxuriance on the hot humid plains at the level of the sea, than amongst the hills, for reasons principally connected with the above.

It is a tap-rooted plant, and it is observed, that when planted in situations where, either from a wet or water-logged subsoil,—a stratum of barren material or rock,—as soon as the tap root reaches the obnoxious substratum that the plants become sickly and unproductive, and in general the prey of insects as an effect, not as a cause. It is usual in planting to pinch off the tap root, in order to diminish the tendency to pivot, as it is termed. One of the causes therefore, of the general impression that the coffee plant requires a hill country, arises from the fact that amongst hills the necessary thorough drainage of the subsoil exists as a natural condition.

The shade plant usually employed in Mauritius and Bourbon is called the "*Bois Noir,*" or *Acacia Lebbeck,* which, with other good qualities, unites that of shedding its leaves

at the season in which the coffee ripens its fruit. A quantity of the seeds of this *Acacia* from Mauritius were presented by me to the Society many years ago; I have since however found it abundantly in this country, and in Ceylon as a forest tree. The clove and nutmeg generally accompany coffee in Mauritius, the latter is however much more fastidious than the plant in question, which I repeat will grow anywhere near the tropics when placed in suitable circumstances.

No. 2.

I had not read the correspondence and documents referring to Col. Ouseley's and the Government's Coffee Plantations in Chota Nagpore, published in volumes 4 and 5 of the Society's Journal, when my first memorandum was penned, which will account for my having alluded to the muster of coffee submitted to my inspection, as being, probably, a *picked* specimen. I consider this correspondence as interesting as it is important. It leaves no doubt on my mind but that Colonel Ouseley has laid the foundation of a branch of commerce which will now rapidly extend, and afford himself that most gratifying of all recompenses,—the satisfaction of having been the instrument of leading to a most extensive good. The introduction of the culture around the natives' houses and gardens should, I think, be the paramount care: once they have tasted the fruits in the shape of rupees, the country will be inoculated, and production extend in compound ratio. They should be shown that very good results arise from planting coffee from cuttings, which yield something even within the year, and the berry is always small and fine. Seedlings, however, should be the main culture, for obvious reasons.

The distance from water-carriage of Chota Nagpore, as compared with the localities mentioned in my former memorandum, (i. e. the Sylhet hills, Carrabam hills, and Assam valley) is fully compensated by the excellence and abundance

of the laboring classes.—(See Col. Ouseley's replies to the queries of a Ceylon planter, Journal, Vol. v. p. 156.) The projected railroad will also come in aid in some reasonable time I have no doubt, and thus make it the field from which an export market may yet receive its cargoes of the valuable staple in question.

The superiority of the sample *C*, the produce of the Government plantation, as compared with *A* and *B*, (which, I perceive, were forwarded to the Society in 1846 and 1848, as the produce of Colonel Ouseley's plantation) is most remarkable. The latter are, notwithstanding the opinion and valuation of brokers, but very second-rate products; bearing, in fact, all the marks of experiment or garden pickings. The sample *C* comes forth as a fine and finished commercial staple, carrying conviction at once, and fitted to compete with the best Jamaica or Mauritius. The berries bear all the characters of having been grown in a soil and climate possessing all the requisites for gradually leading on the fruit, through all its stages, up to complete maturity. The small hard berry, thin shining epidermis, and blueish-green bloom, are all characteristic of favorably grown coffee. As a further proof of the superiority of *C* over marks *A* and *B*, I made experiments by weighing a small struck measure of each kind. The average of three trials of each sample gave—

Mark A, ...	616	grains.
„ B, ...	581	„
„ C, ...	831	„

It is probable, that the clove and cacao, might be introduced with advantage amongst the sheltered plants of Col. Ouseley's plantations, as is always more or less the case in Bourbon and Mauritius. The pepper vine delights in the same humid shade, as also the vanilla, which succeeds well as a creeper against *Acacia* trees.

In those parts of Ceylon where the coffee succeeds best, I have always observed the dolomite rock, or magnesian limestone, to exist. In the ordinary quartz and gneiss soils of the island, the coffee is but short-lived and unprofitable. The existence of limestone rock in the Burkaghur plantation augurs favorably of the soil for this product. In Mauritius and Bourbon the soils are composed of decomposed basalt, and limestone does not exist; but these volcanic soils, wherever they exist, are always of great fertility.

Dear Sir,—I duly received your favor of the 1st instant, and am happy that my communication about the *Sirgooja* seed has been valued by the Society, and am obliged for the information you give me about it extracted from Colonel Sykes' work. I am also obliged for the *Dividivi* seeds, the success of which I will, in time, inform you of. I planted them at once, and they appear to have germinated well.

I have read with much interest Messrs. Willis and Earle's reports on the coffee of this country, as I am about commencing a plantation, being convinced that it will be remunerative, as the plant thrives with all the luxuriance of one indigenous to the country, without requiring any manure or artificial irrigation. The yield per acre I have no means of forming an accurate estimate of, but feel sure it must be large from what I saw of the plants in the government garden when in fruit last year. The plants, if left untrimmed, grow to a great size, 10 to 12 feet high and 7 to 8 feet in diameter of the branches, and several in this state in Col. Ouseley's garden bear as much as one maund of uncleared berries. This country has a great advantage in an almost unlimited supply of labor, at a cost of one anna per day for a man and three pice for a woman. The government garden, consisting of 40 to 50 beeghas, and containing about 7,000 large plants, and an immense number of young ones, has been cultivated by only three gardeners and the occasional

assistance of 25 or 30 prisoners, making the whole expense extremely trifling, and for which a much larger number of plants might have been produced had the object of the garden been profit instead of merely experiment. I think the government and the country will, in a short time, owe great thanks to Col. Ouseley for having, in so enterprising a manner, introduced this valuable staple into Chota Nagpore. I had made an offer to take the garden off the hands of the government for the sake of the young plants it contained, but never having yet received a reply to my offer, I have now withdrawn it, as Col. Ouseley has kindly supplied me with as many young plants as I shall this year require.

I write this, believing that it will be interesting to the Society, and I also enclose a report on the appearance of the plants, drawn up by a gentleman now here, who has had a long experience in coffee cultivation in Ceylon.

RANCHEE: *May 20th,* 1849. T. M. ROBINSON.

To T. M. ROBINSON, ESQ.

MY DEAR SIR,—I have examined the coffee trees in the government garden, and also in Col. Ouseley's compound, and consider their appearance very promising, especially those planted in the shade, and have no doubt, that if the trees were more closely planted, so that when they grow up, they might form a shade of their own to the land, they would be equally as good as the Ceylon plantations.

There is one feature connected with the coffee in Chota Nagpore, which is remarkable, viz. that it thrives on lands that have been cleared for many years, whereas in Ceylon, the planters have been unable to grow coffee on any lands but those immediately reclaimed from forest.

From the appearance of the cured coffee shown me by Col. Ouseley, I should say the color and flavor has been

injured by fermentation. I am quite convinced that, with care in planting and curing, the coffee may be rendered equal to any produced in Ceylon.

RANCHEE: 20*th May*, 1849. J. McKENZIE.

Additional information regarding the "Chú Má," or Grass-cloth plant of China, and its identity with the "Kunchoora" of Bengal, and "Rheea" of Assam; Urtica tenacissima, Roxb.

Your favor of November last only reached me a few days ago. I have now the pleasure of sending you for the Agricultural Society of India some of the root, leaves, fibre and seeds of the *Chú Má*. Hitherto I have been unable to see the plant in flower. The seeds however, if planted according to the directions given in my paper, will doubtless succeed well, and enable you to decide as to its identity with the *Urtica tenacissima* of Roxburgh. Further reflection strengthens the conviction that grass-cloth is manufactured from plants of different varieties if not species. You will observe that the fibre is not fine: specimens of almost any degree of fineness might have been forwarded, but I thought it best to send the product of this place as also the other parts of the plant.

With the above I send several other seeds, some of which may prove useful. The tallow tree is, if I mistake not, peculiar to this part of Asia, and if unknown to India, would prove a valuable acquisition could it be introduced.* A kind

* "It is now very common about Calcutta, where, in the course of a few years, it is become one of the most common trees. It is in flower and fruit most part of the year. In Bengal it is only considered as an ornamental tree; the sebaceous produce of its seeds is not in sufficient quantity, nor its qualities so valuable as to render it an object worthy of cultivation. Cocoanut oil is better for the lamp, and it is only during very cool weather that

of *Brassica* is also enclosed, from which good lamp-oil is cheaply manufactured.

NINGPO: *February 7th,* 1849. D. J. MACGOWAN.

NOTE BY DR. FALCONER.—The leaf specimens now sent from Ningpo, confirm the opinion advanced by me in my former communication (printed p. 219, part iv. Vol. vi. of the Journal), that the *Chú Má* plant, as described by Dr. Macgowan, is not a species of *Cannabis*, but is the same plant as the *Bœhmeria nivea* of Botanists, described under the name of *Urtica tenacissima* by Roxburgh. The specimens from China, correspond exactly with those grown in the Botanic Garden, with which I have compared them. Kœmpfer in the *Amœnitates exoticæ* gives "*Máo*" as one of the Japan names of the plant, and Thunberg, in regard to its uses, says, "Cortex pro funibus conficiendis, et filis validis ad texturas, expetitur." *5th May,* 1849.

In a subsequent communication, dated 10th July, Dr. Falconer observes,—"with reference to my note of the 5th May, I beg to mention, in case of your having occasion to communicate with Dr. Macgowan, that the seed which he sent, along with the *Chú Má*, grass-cloth leaves from Ningpo, has vegetated in the Botanic garden, and turns out different from the leaf specimens, the latter having been derived from *Bœhmeria,* while the seeds have yielded a *Corchorus* (*C. fus-*

this substance becomes firm; at all other times it is in a thick, brownish, fluid state, and soon becomes rancid. Such is my opinion of the famous vegetable tallow of China."—*Roxburgh's Flora Indica,* Vol. iii. p. 693.

"Dr. Roxburgh's mean opinion of the oil of *Stillingia sebifera,* as compared with that of the cocoanut, was founded on his own experience. I am not aware that any of the Superintendents of this Garden have expressed the oil since his time. The natives still call it "*Mom-china,*" but although abundant about the villages in Bengal, they turn it to no account."—*Extract of a letter from Dr. Falconer, Superintendent H. C. Botanic Garden, Calcutta, dated 5th May,* 1849.

cus of Roxb.) Such a difference occurring in an article procured from the Chinese is readily intelligible. The case does not affect the evidence touching *Bœhmeria nivea* yielding the veritable grass-cloth."

Further observations regarding the cultivation of American Cotton in India, and the most suitable season for sowing. By Dr. R. WIGHT, *Superintendent Government Cotton Farms, Coimbatore.*

A day or two after the dispatch of my note of the 17th ultimo, your's of the 7th came to hand, and as it had been nearly all answered by anticipation, I did not think it necessary to trouble you again until I should have it in my power to transmit you a copy of the promised circular, which I have now the pleasure to forward.

The object which I have kept in view, in drawing up that paper, is the establishment of principles. Practical details and results are indispensable, as the materials out of which principles are to be elicited, and these, from the facts and details already in my possession, I hope I have, to a considerable extent, elicited and exhibited. Such being the case, and being now exceedingly pressed for time, I trust those friends to the cause of improvement, who have taken the trouble to prepare reports of their proceedings for my use, will not take it in bad part my now wishing to be for a time at least let off the duty of digesting them into a single report. I do not grudge the labor, but I see so little chance of their enabling me to advance beyond my present digest, that I grudge the time. Next season I shall have to go over the ground afresh, especially in regard to irrigated crops, a mode of culture which has hitherto been too little attended to in India, and then when I have the subject in hand, it is as easy to take it up as the whole as any one part of it. If then you have

such materials in hand as you think will prove useful, either in confirming the principles sketched in this circular, or in showing that I have been hasty in my conclusions, I shall be most thankful to be furnished with them towards the end of this year or early next year, when I can compare them with those obtained from the Carnatic, and possibly add a little more to our knowledge.

Registers seem to be of the highest importance towards arriving at correct conclusions, and these, it is to be hoped, will become numerous.

Except for Madras itself, I have little confidence in those given in the circular. That for Calcutta I constructed from the monthly registers given in the Society's Journals, and several numbers of my series being wanting, it is at best an approximation. But even as such it is useful by affording data whence to deduce principles.

COIMBATORE: *17th April,* 1849.

COIMBATORE: *20th March,* 1849.

(CIRCULAR.)

To JAMES HUME, ESQ., *Honorary Secretary to the Agri-Horticultural Society of India.*

SIR,—In my circular under date 6th March 1848, on the subject of cultivating American cotton in India, I had the honor to submit some remarks on what was then by some considered an insurmountable obstacle to success, viz. the excessive heat of the climate, and solicited aid towards having the question solved, by submitting it to the test of experiment over a wide extent of country, by sowing portions of seed with the first rains following the hot season, and communicating the result. I further stated, that my own impression with regard to the most suitable sowing season, had reference rather to securing a suitable season for harvesting the crop than to the heat of the weather while growing.

2. The replies to my circular have not been so numerous as I expected, but still the information thence obtained, added to that derived from my own previous experience, and much drawn from our recent experiments and from other sources, is, I believe, sufficient to enable me to suggest some general rules for our future guidance, of easy applica-

tion to practice, and such as, I trust, will be found to insure as certain and uniform success in growing American cotton, as now attends the cultivation of the indigenous plant, with the advantage of producing a raw material yielding about 8 per cent. more of the marketable article (clean cotton), and that again returning in the English market a higher price by at least 20 per cent., making together 30 per cent. higher profits to the cultivator, provided he obtains his fair share from the first purchaser. Native seed cotton (Purthee) cleaned by the American gin yields between 21 and 22 per cent. of cotton (Pungee) to seed, American between 29 and 30. When "good fair" native cotton is selling in Liverpool for 4*d.*, New Orleans of the same denomination fetches from 5*d.* to 5¼. (In December 1848 they were respectively 3¼ to 3½ and 4½ to 4¾.) These data I mention as showing the advantage attending the cultivation of American cotton.

3. In my last circular I stated that it had been confidently asserted by Mr. Mercer, an intelligent American planter, that the supply of Indian grown American cotton must necessarily be limited, as it could only be grown in certain localities favored by having a very "mild" climate. By this term he means a cool climate, and therefore considers the plains of India generally unfit for its production, as being much too hot for the culture of that species of cotton. From the first, taught by much previous observation, I was led to question the soundness of that doctrine. I am now, I rejoice to say, in a position not merely to prove it erroneous, but to shew that we have more to fear from deficiency than from excess of heat; or in other words, that the climate of the Carnatic during the cold months, our cotton growing season, is actually colder than the summer of Mississippi, their cotton growing season. They cultivate from April to November, we from September until April; the following table exhibits the mean temperature of Vera Cruz 19.12 N. L. (the native country of Mexican cotton), of Mobile in Alabama 30.12 N. L., of Natchez in Mississippi, and Madras 13.4 N. L. during these two periods.

Table of monthly mean temperature during the cotton growing seasons in Vera Cruz, Mississippi and the Carnatic.

	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Vera Cruz,	77.18	80.42	81.86	81.50	82.10	80.96	78.41	75.38	71. 6
Mobile, ..	70.00	76.36	82.17	82.41	82.73	75.94	69.97	61.50	55.50
Natchez, ..	69.93	72.72	80.62	81.78	80.13	74.99	64.58	55.23	49.09
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April
Madras, ..	84. 6	83. 7	82. 2	78. 9	76. 3	75. 5	77. 7	80. 8	83. 7

4. This table at once disposes of the assumption that excessive heat stands in our way, by showing that the main impediment to our success is not that (our crops being matured under a mean temperature lower by several degrees than those of America), but to our having to contend with a diminishing in place of a rising temperature during the growing season.

5. Mr. Finnie, another American cotton planter now in the service, has started a new difficulty. He asserts, that the climate is much too dry, and that we need not expect to succeed in the culture of American cotton, unless in such places as partake of the rains of both monsoons. This opinion I am now also enabled to prove erroneous on nearly equally conclusive data. Last year and again this year, my sowings commenced before the S. W. monsoon set in, namely, in April and May. The monsoon followed in June and July, my harvest was in active progress in October when the Northern rains commenced: all the crop, still on the ground, and nearly ready to open, amounting to much the larger half, was injured or altogether lost; while fields sown between the 20th July and 10th of August, which came into pick in November after the rains, yielded good crops.

6. The following table, exhibiting the monthly mean falls of rain in Florida and Madras for the same series of months as above, further tends to confirm my view by showing that, as compared with Florida, a cotton growing country, our climate is the more humid of the two.

	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Florida, ..	1.09	6.34	2.39	2.84	3.30	4.35	3.33	1.49	1.13	26.16
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	
Madras, ..	5.24	4.76	10.	12.42	3.25	1.33	0.23	0.36	0.63	38.22

7. These tables leave no room to doubt that it is neither excessive heat nor excessive drought with which we have to contend in the naturalization of the American cotton plant in India, but with a diminishing in place of a rising temperature during the cultivating season. In a single word, cold, not heat, is our enemy. This unlooked for fact being at length clearly ascertained, the question immediately suggests itself, how is this to be met?

8. The course that suggests itself to me is simple, and I believe will be found effective. We learn from the very correct meteorological tables of Madras, that the Madras mean temperature at the beginnings of September is 84°, and that at the end of October it is still as high as 81°. If the sowing is effected between the middle of August and

middle of September the plant will be well grown and sufficiently strong to bear the cold weather of November and December, while there is reason to believe the cold of these months will only so far retard the maturation of the crop as to prevent its coming to perfect maturity before the middle of January, when, though the nights are cold, causing a low mean temperature, the days are bright, warm and dry,* well suited to commencing the harvest which will last through 3 or 4 months.

9. By following this course, as closely as the course of the seasons will permit, it is my firm belief there is scarcely a field, on which water does not lodge so as to become flooded after every fall of rain, in any part of the Carnatic, (watered by the N. E. monsoon) on which, with due attention to agricultural management, Mexican cotton may not be as successfully grown as the indigenous now is. Soils as well as seasons vary, some will be found more, some less productive, and a few, where the plant would not thrive under any treatment; but such cases do not invalidate the correctness of the general principle as regards the fitness of our climate for its culture.

10. Before quitting the subject of heat and cold, I may as well adduce an example of each. Mr. J. Bird, Sub-Collector of Tanjore, had some seed sown the end of April or beginning of May, which vegetated favorably, bore unharmed the hot land winds of June, and was in crop in September. My trials in Coimbatore are nearly equally conclusive. From Mysore Mr. Meppen writes me, that he had planted in two places, the one, Chickamoogloor, enjoying a cool climate, the other, Cuddoor, a warm one. Of the result he says, "the climate of Chickamoogloor is mild, almost similar to Dharwar, yet the plants there did not thrive or bear so well as here, but like those of Dharwar were small, and produced but little: the quality of cotton also, I think, inferior to that of Cuddoor [it is so]. Calculating from the result of this experiment, an English acre will produce nearly 850 lbs." His field was sown 2 feet between the rows and 18 inches from plant to plant, in the rows. The plants rose to from 20 to 30 inches, and a month after picking commenced presented an average of about 7 pods per plant, a low average for plants of that size, but doubtless there were many young ones not reckoned in that average.

11. Hitherto I have confined my remarks to the Carnatic under the influence of the N. E. monsoon. I shall now say a few words bearing on those parts of India partaking more largely of the S. W. one.

* The mean temperature of January at sun-rise is 72°—at noon 81°.

12. I have not at hand satisfactory registers of the rain, but the following approximations may serve the purpose of enabling me to explain the general principles which ought to guide us.

	June.	July.	Augt.	Sept.	Oct.	Nov.	Dec.	Jan.	
Calcutta .. 7 years	11.46	12.14	16.23	7.70	4.94	0.13	0.81	0.50	0.25
Bombay .. Almanac	22.92	25,14	19.64	12.64	1.64				
Trevandrum .. 4 years	16. 4	8.14	4. 2	5. 3	14.97	12.	1. 9	0. 4	0.05
Colombo .. (M. Mark's statist.)	2. 3	16. 7	3. 3	8. 2	7. 1	7. 1	18. 6	1. 6	0. 4

13. Assuming that these are all approximations to the averages of the different stations named, it appears that the growing season would in the two first continue to the end of October; in Trevandrum until the end of November; in Ceylon to the end of December. From the date of sowing until the crop is in a state of maturity and picking fully established, requires from 16 to 20 weeks. At this rate in Bengal and Bombay advantage should be taken of occasional breaks in the weather, to sow between the middle of July and middle of August; in Trevandrum between the middle of August and middle of September; and in Ceylon in September. The weather is still warm enough to promote rapid growth, and, ere the cold nights of November commenced, the plants would have attained their full size, with strength enough to bear the cold, if supported by adequate warmth and bright sunshine during the day, it being now a well ascertained fact that tropical plants are capable of enduring much nocturnal cold, provided they have plenty of light and heat during the day.

14. These suggestions are of course to be understood as mere hints for others to work upon, as my position here prevents my acquiring accurate information on this branch of the subject.

15. A reference to the first of the preceding tables will show that in America they are enabled in their cultivation to follow the natural course of the seasons, having the mild spring for sowing, the warmer and showery summer for their growing season, and the clear dry autumn for harvesting the crop. Here the case is altogether different. The spring months of Southern India are dry and parched with intense heat, the summer ones cooled and refreshed with occasional showers, and the autumnal ones deluged with rain and quite unfit for harvest operations. To adapt the American cotton plant to this course of the seasons is in-

dispensable to success. For this purpose two methods suggest themselves.

1st. The one already sketched, that of employing the earlier weeks of the autumnal period as our spring, the latter ones and part of winter as our summer, and the conclusion of winter and part of spring as our autumn: or

2d. To render ourselves comparatively independent of the seasons by having, as in Egypt, recourse to irrigation, and thereby securing for the growing plant a rising in place of a falling range of temperature, by sowing in October or November according to the season.

16. This idea suggested itself while studying the American meteorological table, and shortly after I succeeded in obtaining a small piece of ground, about an acre, with a well attached. It was sown the end of January, on the 4th February the young plants began to show themselves, on the 10th March many of them were upwards of a foot high, all very healthy, and already showing abundance of "forms," or coming flowers, and that too with the thermometer in the shade daily above 90°, once or twice 96°, proving clearly that high temperature, when there is sufficient moisture in the soil, is not injurious to Mexican cotton.

17. This experiment will, I anticipate, be only partially successful, as we may, in the ordinary course of the seasons, expect cloudy weather and rain in May, which is adverse to the perfect maturation of the crop; but already it goes far towards establishing the principle for which it was undertaken, and had the sowing been in October when our rains ceased, would have proved most successful, as it would now, in that case, have been in full crop.

18. Fortunately this is not the only experiment of this kind in progress. While drafting this paper, I received from Captain Lawford, Civil Engineer 6th Division, a note informing me that he had engaged in a similar experiment some months ago in the hope of being able to show the Natives of Tanjore, that cotton so cultivated would yield at least as profitable returns as rice, which he states is there hardly worth planting. He says "I hope you will approve of the plan of irrigating all cotton, as it will, in a great measure, render the crop independent of season. Since I sowed the seed received from you in October, we have had scarcely any rain, but I have a splendid crop in good soil where the plants are 4 feet high and the pods very large." This I consider a most valuable experiment, and will, I trust, find many imitators, especially in those parts of the country where the rains are scanty and uncertain: the seed was sown in November, the picking commenced about the middle

of February, and now (15th March) the plants are in full growth, covered with crop in all stages, from 'forms' up to open pods.

19. Up to this time we have had no experience in this mode of cultivating cotton, but I would suggest as a precaution, that water should be rather sparingly supplied;* that little or none should be given from the time the picking commences, or rather perhaps for some time before, as the plant when grown in rich moist soil is apt to become too luxuriant, in which case the produce is not properly ripened. If in active and luxuriant growth when the crop is ripening the pod does not open at the proper time, the cotton being highly hygrometric, absorbs moisture from the enclosing capsule, and gets spoiled before it bursts. The very bright warm weather of March, April and May, the harvest months of irrigated cotton, will do much towards counteracting this evil, but not altogether if the plants are kept freely watered and growing.

20. Having thus briefly, but I trust clearly, explained the principles which ought to guide us in the cultivation of American cotton in India, I shall in conclusion, say a few words on the practical details which demand our attention.

21. The first point relates to the choice of soil when selection is in our power. The best crops I have yet seen have been obtained from dark brown, very light sandy loams, mixed with much kunker limestone, a kind of soil easily worked, very permeable to rain, and easily penetrated to a great depth by the roots. Red soils having a large admixture of sand securing for them the above properties, also answer well and are easily cultivated. The stiffer clayey soils have not answered so well, except in seasons when we have had frequent showers, keeping them in an easily workable state, as they are liable to bake and become very hard in dry weather. The black cotton soils were a good deal tried at first, and I now think rather prematurely condemned as unsuitable for the American

* The above field (see para. 16) on which picking will commence in a few days, was four times watered, once preparatory to the last ploughing - once immediately after sowing—once after the first hoeing, and lastly had one shower of short duration when about 2 months old. The ground between the rows was ploughed when about 6 weeks old. No more water is required. The plants are healthy and vigorous, not large, but in proportion to their size covered with an uncommonly abundant crop. The hottest season of the year, therefore, is clearly the best season for the cultivation of Mexican cotton in India so long as a moderately humid soil can be secured. The aggregate quantity of water supplied to this field has not, I believe, exceeded 2 inches between the 20th January and 15th April.

plant. Subsequent consideration has led me to some extent to doubt the justice of the verdict, and I would like to be in a favorable position to test the correctness of the conclusion by a second trial, with our additional practical knowledge and skill.

22. The second point to which I would call particular attention is, the preparation of the ground for the reception of seed. Too much care cannot be bestowed on this. The land should be well ploughed, the deeper the better, from 4 to 6 months before the time for sowing, and allowed to lie fallow. If there is rain in the interval, it should have a second ploughing, so as to keep it thoroughly open and freely exposed to the conjoint action of the air and sun, which, while it prevents excessive absorption of heat, greatly promotes fertility, and cleans the land by exposing and killing the roots of such perennial weeds as may be in it: lastly, it should have a final ploughing just before sowing. If sown in drills, according to the American practice, it should, while the plant is still small, be ploughed once or twice between the rows. If broad cast, this cannot be so conveniently done; the hoe must then suffice. After the third leaf has appeared, the ground is hoed and the plants thinned out to six or eight inches between them—this will leave enough to allow of considerable destruction during the subsequent ploughing. A second hoeing is always deemed necessary in both American and Native practice, when the "Stand" should be further thinned, to from a foot to 18 inches between the plants. If the growth is vigorous, not less than an average distance of 18 inches should be allowed; otherwise, a foot may suffice. In moderately fertile and high and dry lands from 2½ to 3 feet between the rows is enough, but for moist, low lying rich soils 5 feet is not too much, as in such circumstances the bushes will still fill the ground, it being a very strong growing plant, and unless it has plenty of room the crop blights. So managed, I have seen it produce from 1000 to 1100 ℔s. per acre, but half of that may be considered a fair crop, which is double the amount of what, in this district, is considered a good Native cotton crop, and yields owing to the higher percentage of cotton to seed 100 ℔s. more of clean cotton. The labor and care bestowed in cultivation is greater, but the return much more than covers it, even leaving out of consideration the higher value of the article produced, which of itself would afford a compensation supposing the quantity of seed cotton weight for weight was simply the same.

23. The last point to which I would direct attention is, that, however promising in appearance, we have never succeeded in obtaining a really good second crop of the same bushes. I would, therefore, always re-

commend the plan of cultivating the Mexican cotton plant as an annual; and never to sow the same land oftener than every third or fourth year, as it seems a very exhausting crop.

24. In illustration of these views, and to facilitate their application, as well as for the convenience of easy reference, I have appended Meteorological Tables of several places. That for Madras, as being the one which most concerns us, is for every 10 days throughout the year, the others are monthly. The Madras one is for both temperature and rain, the others for one or other as I could find them.

25. I have only further to add, that I can furnish seed to those requiring it for further experiment, having several thousand pounds available for the purpose. July and August being the time for sowing under both monsoons, there is still ample time for supplying it.

I have the honor to be, Sir,
your most obedient Servant,
ROBT. WIGHT, *Surgeon,*
Superintendent Cotton Farms.

[The following extract of a letter from Dr. Wight, dated 30th October, 1849, being connected with the above subject, is appended in this place.]

"The Court's orders for the renewal of the cotton experiments only arrived a few days ago, much too late in the season for operations as a dry land crop. I am now, therefore, exerting myself to make a few experiments this season with aid of irrigation, and expect to have the first field, to be so treated, sown this week, and others in succession to the middle of December. Under this system I expect to realize larger and much more certain crops than we have yet done, treated solely as a dry crop. My experiments last season, though made under the greatest disadvantages, turned out so well as leaves me scarcely a shadow of room to doubt the realization of the most ample success. In employing irrigation I acted differently from the course usually pursued. The water was thrown on ground previously ploughed and open for its reception, by which three or four times the quantity was absorbed, and sunk deep into the soil. A few days after, that is, as soon as it was in a fit state to be worked again, the plough was passed lightly between the rows, to break up and loosen the dry cake, by which it was prevented hardening and baking on the surface, and never got over-heated by the absorption of solar heat. By adopting this precaution three waterings proved sufficient to bring the crop to maturity, though sown the end of January and not above ground until the 4th or 5th of February, and that too, with the thermometer daily ranging in the shade between 90° and 100°. The crop was very heavy, but was of course in great part spoiled by the April and May rains which proved heavier than usual at that season. A crop sown in November will, I expect, be in full bearing in February, and continue yielding crop until the rains of April and May set in. A thorough watering, on loosened open ground, in January will, I anticipate, be the last that will be called for, but of course the land should be again loosened and kept in readiness for a subsequent one, if required. Such is the plan I propose following this season."

METEOROLOGICAL REGISTER *for* **MADRAS,** *extracted from the Madras Almanac for* **1848.**

Date.	January		February		March		April		May		June		July		August		Septr.		October		Novr.		Decr.	
	Th.	Rain	Th.	Rain	Th.	Rain	Th.	Rain	Th.	Rain	Th.	Rain	Th.	Rain	Th	Rain	Th.	Rain	Th.	Rain	Th.	Rain	Th.	Rain
1st to 10th..	75.3	0.55	76.8	0.03	79.8	0.02	82.7	0.06	85.9	0.32	88. 5	0.34	86.2	1.00	84.6	1.77	84.5	1.40	83. 1	2.65	79.7	4.49	77.3	2.23
10th to 20th..	75.5	0.53	77.8	0.00	80.7	0.11	83.7	0.08	86 8	0.11	88. 4	0.49	85.1	1.21	84.6	1.51	83 4	1.25	82. 0	2.43	78.8	5.09	76.1	1.80
20th to 30th..	75.9	0.11	78.5	0.01	81.8	0.58	84.7	0.26	87.7	0.65	87. 3	0.63	84.8	1.52	84.6	1.48	83.2	1.65	81. 1	6.04	78.2	4.55	75.7	0.58
Mean ..	75 5	1.19	77.7	4	80.8	.71	83.7	40	86.8	1. 8	87.70	1.46	85.3	3.73	84.6	4.76	83.7	4.00	82.02	11.12	78.9	14.13	76.3	4.61
Max. ..	86.0	..	87.0	..	90.2	..	94.7	..	99.2	..	98. 2	..	95.2	..	92.4	..	92.9	..	91. 5	..	87.0	..	84.0	..
Min. ..	65.0	..	66.0	..	69.7	..	75.4	..	78.5	..	79. 4	..	73.5	..	73.4	..	72.3	..	70. 6	..	67.6	..	65.8	..

REGISTER *of monthly mean Temperature for the following cotton growing Districts.*

	Lat. N	Long. W.	Jan.	Feby.	March	April	May	June	July	Aug.	Septr.	Octr.	Novr.	Decr.	Mean of year
New Orleans, Louisiana ..	29.58	90. 7	56.75	58.39	66.58	72.41	77.26	81.18	82.22	82.12	79.42	69.71	58.71	52.26	69.80
Houston, Texas	31.54	95.56	65. 2	60. 5	68. 7	72. 7	85. 5	80. 1	84. 2	81. 4	83. 5	72. 3	62. 3	60. 0	73.03
St. Augustine, Florida ..	29.50	81.27	60.73	64.97	67.55	70.06	76.89	81.41	82.81	82.67	80.16	73.83	63.55	60.92	72.13
Savannah, Georgia ..	32. 5	81.10	52.15	53.74	61.19	67.36	73.14	77.89	82.23	82.09	75.96	66.92	57.20	50.50	66.70
Columbia, Carolina ..	34. 0	80.58	37. 7	42. 9	47. 3	62. 2	67. 3	72. 4	76. 1	76. 5	66. 3	53. 2	43. 7	39. 5	57.09
Madras .. 10 A. M. ..	13. 4	80.14	78. 9	80. 6	84. 3	87. 3	90. 3	89. 7	87. 0	86. 1	86. 0	84. 2	80. 6	79. 1	..
Madras .. 10 P. M. ..			75. 5	77. 0	80. 7	83. 7	86. 1	86. 3	85. 0	84. 3	83. 5	81. 7	77. 8	76. 2	..

MONTHLY REGISTER *of* **RAIN.**

	Jan.	Feb.	March	April	May	June	July	Augt.	Septr.	Octr.	Novr.	Decr.	
Florida	1.82	1.34	1.98	1.09	6.34	2.39	2.84	3.30	4.35	3.33	1.49	1.13	between 1822 and 1848, both inclusive.
Madras mean of 22 years..	1.33	0.23	0.36	0.63	1.03	2.03	3.20	5 24	4.76	10.09	12.43	3.25	
Trevandrum 4 years.. ..	.40	.05	2.28	3.04	7.60	16.40	3.14	4.20	5.30	14.97	12.	1.90	
Calcutta mean of 7 years..	0.50	0.25	1.18	3.37	5.08	11.46	12.14	16.23	7.70	4.94	0.13	0.81	
Coimbatore 7 years	1.33	.03	1.22	2.50	2.15	.85	.18	.11	.81	6.32	3. 0	2.46	

Failure of attempt at cultivating the Tea Plant at Darjeeling.
By Dr. A. Campbell.

I am sorry to inform the Society, that my trial to cultivate the tea plant at Darjeeling, has failed.* The winter before last the transplanted seedlings suffered a good deal from the frost and one fall of snow, but during the subsequent rains they revived, and I was still in hopes of success: although not sanguine, for it was Dr. Hooker's opinion, that if the plants *did* thrive, it was probable that the vigour of vegetation during the spring and summer would not be great enough to produce such a quick succession of young leaves as would make the crop a profitable one. This is most probably a very correct opinion, but I shall not be able to test it, for, two falls of snow during last winter killed almost all my plants; and I consider that it will be necessary to limit future trials of tea cultivation at this place to elevations of 4,000 feet or thereabouts. This knowledge is something gained at a considerable cost, and accompanied by a disappointment.

Darjeeling: *July 12th,* 1849.

* Some interesting particulars on this subject, submitted by Dr. Campbell, are published in Vol. vi. p. 123. This second communication is useful as indicating the elevation in the Himalaya at which the tea plant cannot be grown with any prospect of advantage. The same result took place with the plants, tried in the experimental garden at Mussooree, 6,500 feet. The winter proved too severe for them.—Eds.

Correspondence and Report on the Cochineal of the Punjaub.

Captain F. C. Burnett, of the Artillery, in a letter to the Society, dated 13th February 1849, from Camp Deenanuggur, in the Punjaub, alluding, among other interesting details connected with the products of that country, to the cochineal insect, writes as follows:

"I intend sending the Society a specimen of the cochineal insect indigenous to this part of India; it is picked from the common *Cactus,* of which there are immense hedges, but in

consequence of a sudden influx of those insects they have been generally destroyed this year. The Cashmerian shawl manufacturers are the great consumers of the dye. I obtained from the Cashmerians, resident in the town, a small sample of the insect, which they call "*Kirrim,*" and have procured a larger supply by payment of a trifle. I also obtained a small specimen of the *Pashmeenah* yarn dyed with it; but they tell me, they can dye other colors with it by using different ingredients, and I never saw brighter colors. I bought a shawl which was a very fine specimen of their different colors. I suspect it will be years before the *Cactus* recovers this blight. I should like to hear what is thought of the dye by the Society.

Mr. D. F. McLeod, of the Civil Service, writing from Dharmsala, near Kangra, under date 1st July, adds the following particulars on the same subject:—

"With reference to the recent discussion regarding the cochineal of these parts, it may interest the Society to learn that the vast abundance of these insects which attracted Dr. Dempster's attention, resulted from a most unwonted immigration of them; and one most destructive to the prickly pear cactus on which they feed. This plant had previously become so abundant throughout the whole of the Jullunder Doab, as to be quite a nuisance, insomuch that Shere Singh, when ruler of Lahore, inflicted fines on parties allowing it to extend: but in that single year such was the havoc committed by these insects, that hardly a plant of it is now anywhere to be found in the whole Doab. Whether the insect has taken to any other plant,* or was known to any extent previously, I

* The cochineal insect is not known to take to any other plant besides certain species of *Cactus*. The vast diffusion of the prickly pear all over India, and its immense abundance in remote regions like the Punjaub, form one of the most remarkable instances of the naturalization of a foreign plant known within the range of Physical Geography. The plant, as may be generally known, comes originally from America.—Eds.

have not been able to ascertain with any precision, but believe neither to be the case: neither am I aware whether the same has occurred on the other side of the Beas and Sutledge, but should think it must be so to a greater or less extent?*

On the receipt of the specimens promised by Captain Burnett, they were transferred to Dr. Falconer, who has obliged the Society with the following report on them:—

BOTANIC GARDEN: *10th July*, 1849.

I have examined the specimen of cochineal from Captain Burnett, together with the piece of yarn dyed with it, which you have sent for my inspection. The insect has evidently been very roughly prepared, probably a first attempt, and no fair estimate of the Jullunder cochineal can be formed upon Captain Burnett's sample, which is of a very inferior description, viewed as an article of commerce. The yarn also, is of a dull and dingy red, and will not admit of a comparison with the bright and lively scarlets, produced by Dr. Dempster, this being also doubtless equally attributable to the imperfection incident to an early stage of experiment.

With reference to the discussions on the subject, at some of the late meetings of the Society, I may remark, that the desideratum as regards our Indian dominions, does not lie in the production of a cochineal which will dye a fine deep color, but in *producing an article which will quantitatively yield a remunerating amount of the dye.*

The cochineal raised in the Botanic Garden, during the experiment of 1796, from the insect introduced by Capt. Neilson, afforded a color equal in intensity to the best *Mexican* or *Mestique.* The same result, at the same time, was produced by Dr. Berry at Madras, who dyed flannel of a

* Major Madden, in his interesting paper on the Turaee and outer mountains of Kumaoon (Journal Asiatic Society of Bengal, Vol. xvii. p. 583) states, that the common prickly pear (*Cactus Indicus*) was also annihilated at Almorah in 1845 by myriads of a species of *Coccus.*—EDS.

color equal in brightness to the *best scarlet:* the insect experimented on was the "*Grana sylvestra*" kind, which, by the consent of all observers, does not yield more than one-third of the coloring matter afforded by the *Mexican, Mestique* or *Grana fina.* Hence after a trial of 12 years, fostered by a liberal premium, the production of Indian cochineal proved a failure, as a remunerating article of export, although 55,000 ℔s. of the article had been transmitted to Europe between 1796 and 1799.

These objections would appear to apply equally now to the cultivation of the *wild cochineal* in the North-Western Provinces. The expenses of collecting, preparing and drying *Grana sylvestra,* are at least as much, if not greater, than those attending "*Grana fina,*" while the yield of coloring matter, and commercial value of the former, are but one-third of the latter.

The Punjaub observations and experiments do not seem to establish more than the great abundance, facility of production, and hardness of the *naturalised* "*Grana sylvestra,*" for strictly speaking, it is not *indigenous.* But the growth of *Grana sylvestra,* has nowhere—in India at least—been remunerating. Much encouragement is presented, for an experiment in the growth of cochineal, in the Punjaub, but it appears to me, that it can only be made, with any reasonable prospect of success, by introducing the "*Grana fina.*"

Report of the Committee convened to consider the proposed prize for an improved Cotton-cleaning Machine, unrestricted by any particular mechanical principle; and the suggestion that the Society shall procure drawings and models of Agricultural Machines.

Your Committee having taken into consideration the proposition contained in Mr. H. Mornay's letter, dated the 11th December 1848, suggesting that a prize be offered by this Society for an efficient cotton-cleaning machine, unrestricted by any particular mechanical principle; and also the suggestion made by Major F. Jenkins, that the Society do place themselves in communication with Messrs. Ransome, of Ipswich, and obtain from them priced lists and drawings of agricultural machines, with the proposal, in addendum, that models of these machines be also obtained from the same parties, now beg to submit their report upon the above propositions, with suggestions as to the mode in which it appears to them these proposals would be most effectively and advantageously carried out.

2nd. With reference to the propriety of encouraging the invention of an efficient machine for divesting cotton of its seed, it is a desideratum of such high and national importance, that there could not be two opinions on the subject; and it only remained for your Committee to determine the value of the prize it appears expedient to offer to any one who should succeed in contriving such an instrument, the conditions under which the prize should be submitted for public competition, and the period of time, if limited, that the reward should be declared open to be competed for.

3rd. It would seem, that there is much difficulty in contriving a cotton-cleaning machine which shall not only be perfect in its action in divesting cotton-wool of its seed, but also possessing the several qualities of expedition, simplicity, and comparative cheapness, so necessary to render it likely to

come into practical use. Not only therefore is great ingenuity required in its contrivance, but doubtless much valuable time and expence would be consumed and incurred in experimental trials, before a model could be produced possessing all the practical qualities required. Your Committee are therefore of opinion, that it is desirable that a high pecuniary reward be offered as a stimulus to inventors. With reference therefore to its great national importance, we recommend, that Government be solicited to place a certain sum, such as they may deem fit, to be awarded by the Society, in conjunction with their gold medal, to the successful inventor of such an implement. In making this suggestion, your Committee have in view the earnest interest and liberal encouragement which Government have always taken in and afforded to the improvement of this great Indian staple, concluding that this proposition is consequently such as will be at once readily met, and cordially co-operated in, by them.

4th. With regard to the conditions under which the prize should be offered, this subject has had the deliberate consideration of your Committee. The *churka*, as constructed by the natives, in its most efficient form, is of course an extremely cheap machine, and it could not reasonably be expected that a perfectly acting apparatus, *however simple in principle*, could be properly constructed at any thing like so low a rate. The cheapness of the native instrument is counterbalanced by the extreme slowness of its action, and other numerous disadvantages, and a more expensive machine, possessing all the necessary practical qualities, would, no doubt, eventually supercede the native method, and contribute towards the important desideratum of restoring the *export trade* in this article. Your Committee are therefore of opinion, that the cost of the machine should not be a *specified* condition, restricting inventors competing for the prize. Indeed, it appears to them that the offer should be made as free and general as possible, leaving the practical

merits of the contrivances to the judgment of the Society or their Committee, who would duly consider the several questions of cost, complexity, &c. relatively with the results in regard to power, speed and action.

5th. We think it should be made a condition, that the machine be successful in cleaning the ordinary *short staple* cotton grown in India.

6th. With reference to the question as to whether the time should or should not be limited, it appears desirable that a stated period be fixed for the prize to be open to competition. Your Committee therefore propose, that the 1st March 1852, be fixed as the date on which the trial of the machines sent in to the Society shall take place; and that each competitor shall send a full-sized working model of his invention, to the Society's rooms, at the Metcalfe Hall, with a letter and description of the machine, and its mode of working, addressed to the Secretary, on or before the 1st February of that year, in order that the necessary arrangements for the trial may be made. Should no successful machine be produced during that time, the Society could renew the offer if necessary.

7th. In case of there being only one candidate, your Committee consider, that were his invention found superior to the native instrument, and that for which the Society have already awarded a prize, it would yet remain to be determined whether the merits it possessed were, under all the circumstances, sufficient to warrant the conclusion, that it was likely to come into practical operation to the *eventual* supercession of the others, such as to entitle it to the prize. In the event of there being more than one competitor, and the prize being awarded, perhaps it might be well to award a silver medal to such unsuccessful competitors, whose models showed much ingenuity and comparative success.

8th. Your Committee further recommend, that it should be made a condition, that the Society shall have the option

of purchasing *the* machine submitted, for which the first prize is awarded, at the cost price of its construction.

9th. It has been suggested by a member of your Committee, that it is also desirable that the Society shall offer a separate prize for an efficient "cotton-thrasher," adapted to free either *kupas* or cotton of the indigenous kinds, from dirt and trash. From the enquiries we have been able to make, it appears that such a machine is much wanted, and recommend therefore, that a silver medal and 250 Rupees, being the amount of the accumulated interest on Major Jenkins' premium of Rupees 500, placed with the Society in 1839, be offered to the successful inventor of such an instrument. The same rules to be applied, in the decision of the merits of this, as are proposed for the cotton-cleaning machine.

10th. On the subject of the proposition made by Major F. Jenkins, your Committee are unanimous in their opinion, that it would be both desirable to obtain from Messrs. Ransome priced lists and drawings of agricultural machines, and also to obtain models of such as are likely to be applicable to Indian cultivation. We would suggest, therefore, that the Honorary Secretary be requested to place himself in communication with Messrs. Ransome, first to obtain from those gentlemen the priced lists and drawings, after which the Society could select such as were most desirable to get models of, to the amount the Society could afford for this purpose, and then forward an order for their manufacture.

11th. It would also be desirable that the Society should possess full-sized working models of all the cotton-cleaning machines known in practical use, including Mr. Mather's *churka.*

CALCUTTA: HY. MORNAY.
24th June, 1849. WM. SAGE, *Lieut.-Colonel.*
J. H. MATHER, *Civil Engineer.*
J. M. VOS, *Civil Architect and Engineer.*
T. F. HENLEY.

FROM W. GREY, ESQ.,

Under-Secretary to the Government of India,

TO W. SETON KARR, ESQ.,

Under-Secretary to the Government of Bengal.

Home Dept. SIR,—I am directed to acknowledge the receipt of your letter No. 673, dated the 21st ultimo, submitting a letter from the Secretary of the Agricultural and Horticultural Society, containing the Report of the Committee appointed by the Society for the purpose of considering the expediency of offering a prize for an efficient cotton-cleaning machine, unrestricted by any particular mechanical principle.

2. On the recommendation of this Committee the Society now solicit the Government to place a certain sum at their disposal to be awarded by the Society to the successful inventor of an improved and efficient machine.

3. I am directed to state, that the President in Council is willing so far to meet the wishes of the Society as to consent that a reward of 5,000 Rs. shall be announced to be given on the 1st of March, 1852, to the inventor of an improved cotton-cleaning machine, such as in the opinion of the Government shall perfectly attain the principal objects in view as described in the 3rd para. of the report rendered by the Society's Committee.

4. His Honor in Council would wish, that the machines submitted by competitors for this prize should, in the first instance, be examined and reported on by a Committee appointed by the Society. But the Government will also nominate such persons, as they may see fit, to examine the machines submitted to competition, and the report of the Society's Committee must be forwarded to Government, with whom alone will rest the ultimate decision in the matter.

5. I am desired to add however, that in case of no machine being adjudged worthy of the prize offered, the President in Council will be ready to accord a smaller prize for any

machine of merit in proportion as such machine may be pronounced more or less to have attained the objects aimed at.

I have, &c.,

COUNCIL CHAMBER: (Signed) WM. GREY,
1*st September,* 1849. *Under-Secy. to the Govt. of India.*

[A form of advertisement, notifying the conditions under which the above mentioned prize, and those alluded to in the Committee's report, would be awarded, having been submitted to, and approved of, by Government, steps have been taken to make the circumstance generally known, and for the distribution of copies throughout India, Europe, and the United States of America.—EDS.]

Some account of the "Sirgooja" or "Ram-Til" seed; Verbesina sativa, Roxb.: Ramtilla oleifera, Wight: Guizotia Abyssinica, Cass. Communicated by T. M. ROBINSON, ESQ.

I have sent you to-day by dawk banghy, a small sample of an oil seed common to this district, which may have never yet been brought to the notice of the Society, and which is, I think, worthy of attention.

It is called by the natives "*Sirgooja*," and its oil is used for food by the poorer classes all over Chota Nagpore, who raise it in large quantities for this purpose. The oil mixes with colors quite as well as linseed oil, and it will dry *without* litharge, although a little improves it: as a burning oil it is certainly not equal to cocoanut and many others, even when clarified by boiling on water, without which it gives a very dull red light. I am of opinion, that this seed will yield more oil than an equal quantity of any other I have ever seen, owing to the extreme slightness of its skin, while the produce of its pulp is greater than that of most oil seeds, and I expect fully equal to that of linseed. I perfectly remember seeing some of it in London about six years ago, when I endeavoured in vain to ascertain whence it was imported; it was named *Niger* seed, and sold at the current price of the

best linseed, considerable desire existing among the crushers to get further supplies, but as none ever arrived, I presume it must have been an unprofitable shipment.

The expense of carriage from this district to Calcutta, renders its cultivation for export useless, but it would no doubt thrive in other districts where this objection would not exist. The soil and climate of Burdwan, for instance, would, I think, suit it perfectly.

RANCHEE: 14*th April*, 1849.

[The seed alluded to in the foregoing communication is produced in Burdwan, as also in Beerbhoom, Midnapore, and other districts of Bengal, where it is employed for the same purposes as in Chota Nagpore. From the following extract of a paper by Col. Sykes, published in the Proceedings of the Committee of Commerce and Agriculture of the Royal Asiatic Society of Great Britain and Ireland, entitled an "Account of the cultivated oil and cordage plants of Dekhan," it will be seen that the same plant is cultivated also on the other side of India, though under another name :—"*Karleh, Kalee-Teel, Verbesina sativa.* From its being frequently called *Kaleh-Teel* (black sesamum,) it is confounded by Europeans, not botanists, with the sesamum, but it is an entirely different plant. Its seed produces an edible oil, which is the great substitute for ghee (clarified butter) with the poorer classes of the cultivators and the population generally; 12 seers of seed in bulk in a stone-mill produce 3 seers, or 6 lbs. of oil in weight, or 25 per cent. Price at Neelsee in April 1825, 20 seers measure for two shillings. The oil cake is in high esteem for milch cows; price at Poona in January 1825, 60 seers, or 120 lbs. for two shillings. Feverish and asthmatic persons, and those whose digestion is not strong, cannot eat the *Karleh* oil with impunity. As an edible grain, *Karleh* is only used in acid and pungent condiments. Unnoticed in price current."

The seed is again referred to, in the proceedings of the same Committee, with several other Indian oil seeds, on which experiments were carefully made by Mr. E. Solly; and from which it would appear, that the "*Sirgooja*" yields about 35 per cent. of oil or 10 per cent. less than "*Til*" seed (*Sesamum orientale*) known in commerce as the *Gingelie* oil.

It may be mentioned, as confirmatory of Mr. Robinson's remark, that the seed sent down by him was immediately recognized by a mercantile member of the Society, as precisely similar to a sample forwarded to him, some time ago, by a friend in Liverpool, under the name "*Niger*," with the view of ascertaining whether it was cultivated in Bengal. The seed in question, it is supposed, was obtained from the Western coast of Africa, of which country, the plant yielding it, is likewise a native.—EDS.]

Further particulars regarding the efficacy of Aristolochia Indica as an Antidote to Snake-bites. Communicated by R. LOWTHER, ESQ., *C. S.*

To JAMES HUME, ESQ., *Honorary Secretary to the Agri-Horticultural Society of Calcutta.*

MY DEAR SIR,—If you should require some seeds of *Aristolochia Indica,* I can forward a supply. The arguments brought forward by the Editor of the *Madras Spectator,* against the asserted virtues of this plant as an antidote to snake-bites, are any thing but conclusive. The Editor argues that because it has signally failed in numerous experiments on the brute species it cannot be considered of any use when administered to the human subject, and it is insinuated that I must have been deceived or imposed upon in the numerous instances in which I used it with success. I tried the experiment on four dogs some time ago, and it appeared to me that the *Aristolochia* accelerated the action of the poison; this, I think, may readily be accounted for from the fact that the canine species, when under the influence of the poison, are in a high state of febrile excitement; whereas with the human subject, the action of the heart soon becomes torpid, and the body as cold as marble, in the latter case it is the powerful *stimulating* effects of the plant which rouses the heart into action, in the former case the mischief is aggravated. In the first experiment I found that the body of the dog was of a much higher temperature some hours after death than in a dog in good health, there can consequently be no analogy between the human and the brute species. I have tried ammonia upon the dog when under the influence of snake poison with no better success, yet there are numerous instances in which it has saved the life of the human subject. In three cases, some years ago, I used it with success.

I had a very anomalous case before me on the 2nd instant. A *Chumar,* who lives close to my gate, was removing a heap

of dead leaves in a mangoe grove, and was bitten on the top of his middle finger. He instantly ran over to my house and informed me, that he had been bitten by a snake, though he had not seen the reptile: there was a drop of blood on the wound, which bore the evident marks of a fang. It was suggested by some of the bystanders that he might have been stung by a scorpion, but that any doubt on the subject might be cleared up by giving him some *neem* leaves to chew; it was suggested, that if bitten by a snake the patient would be insensible to the bitterness of the leaves; some leaves were plucked from an adjacent tree, and the man declared they were tasteless! During this interval the *Aristolochia* was being prepared, and was shortly administered; but he had scarcely swallowed the dose than he became stupid and cold, though not insensible. He was assisted by a couple of men to walk up and down; during his progress he sunk, and attempted to vomit, but nothing was thrown off the stomach. He complained of a violent burning pain up to his elbow, and especially in the finger; at this time he was as cold as death. Supposing, however, from the heat and pain on the affected part, that he might have been stung by a scorpion, I applied the leaves of the *Chichera*, [*Achyranthes aspera?*] which affords speedy relief under such accidents, but to no purpose; hot mustard oil was likewise tried, but with no better success. During the treatment he complained of great thirst, but having administered four leaves in two doses, and finding that the man had entirely recovered, with exception to the pain in his hand and arm, I allowed him to depart, directing him to come over at 10 at night for a dose of oil. On his attendance he still complained of pain in his hand and arm: I then tried vinegar and ammonia as a lotion, but to no purpose; he waited upon me on the following morning quite well. I have only witnessed one case in which the patient complained of intense pain in the region of the bitten part, it was on the instep, but she complained of extreme heat

in the *stomach,* but that was soon subdued; in the present instance, the man was in great pain for some hours. Yesterday one of my servants was stung by a scorpion: he suffered great pain until hot mustard oil was applied, but the temperature of the body was not changed though he complained of intense heat in the hand and arm.

I have recently heard that the *Aristolochia* is used with great success in the Bengal districts for ague by the native faculty.

ALLAHABAD: *5th May,* 1849.

Mode of cultivating the Strawberry at Cawnpore. By Lieut. JOHN ELIOT, *Artillery.*

As I was very successful with my strawberries this year, and it is generally supposed they will not answer at this station, I will describe the plan I pursued by the advice of a very intelligent *mallee.* The ground had only been cropped one year. I procured about equal quantities of sand from the bed of a *nullah* (river sand will not answer), brick-dust from an old kiln, and farm-yard manure. With this compost I thickly manured the ground about the middle of October, and planted strong plants about a foot apart on each side, the beds being about 4 and 5 feet wide; they were watered moderately at first, i. e. about every 4 or 5 days, but when they commenced flowering, every two days. In flavor, quantity and size, I have seen nothing in India to surpass them. It remains to be proved how the plants stand the rainy season. The ground is well drained, and I am greatly in hopes a large stock will survive: the hot weather and white-ants have killed about a twentieth.

CAWNPORE: *21st June,* 1849.

I forgot, when last writing on the subject, to mention one plan I tried with my strawberries, which, as it was success-

ful, you may think worthy of record. After marking off the beds I dug the mould out 15 or 18 inches, and then put in a layer of broken tiles about 6 or 8 inches thick, and then filled in the mould. The idea I took from the *Gardener's Chronicle.* I tried two beds in this way, and very nearly all the plants I have saved from last season have been from these two beds. The plan would probably be still more efficacious in Bengal.

15*th October*, 1849.

Correspondence and Report connected with certain samples of Cotton from Assam and Moulmein.

MY DEAR SIR,—This is to advise you, that I have sent to the address of the Society two bales of raw cotton from the North-Eastern district of Assam, the "Muttock Division," which I believe is a good deal superior to the common cottons of Assam and Goalparah. It is the only cotton in this province grown on the plains, all the rest being produced on the hills by Garrows, Cacharees, and Nagas, with the exception of very small quantities grown about the villages for home consumption. I shall be much obliged if you can have this cotton cleaned by Mr. Mather's *churka*, and then submitted to the Society for opinion.

Perhaps the cotton would show to better advantage if it was first picked and sorted; for it does not seem to be all of the same quality.

There is a vast quantity of ground in Muttock, well adapted for cotton, lying waste, and if this cotton shows an improvement upon the common Garrow cotton, there will be, I think, grounds for supposing that Muttock would be a good locality for an experimental plantation. The seed will be the same as the Garrow, and it is cultivated in just the same rude manner as on the hills, so that any improvement will be attributable to advantage of soil and climate: and these,

with better culture, might, with finer kinds of cotton, produce an article fit for exportation.

GOWHATTY : I am, &c.,
29th December, 1848. FRANCIS JENKINS.

Extract of a letter from Major JENKINS, *dated Cooch Behar, 12th February*, 1849.

"I have asked Major Matthie to send per steamer a bale of cotton from the Naga hills, south of Jorhaut, and I believe the cotton will be found a fair sample of the general produce, but inferior to the Muttock.

"I am in a very barren part of the world at present, where there is nothing to interest the Agricultural Society, but the country is very much improving in the general extension of cultivation, and in the substitution of superior for inferior crops. In these parts, heretofore, there was scarcely any thing but bare *dhan* and millet: there is now a good deal of *salee dhan* from greater care in levelling and bunding the fields; a large breadth of wheat, though poor looking in general,—for the soil is scarcely more than fine sand,—with much *dal (mussoor* and *khessarree)* in the *dhan arishes;* abundance of mustard seed, and goodly patches of tobacco. I have not seen a sugar-cane this side of Goalparah."

To JAMES HUME, ESQ., *Honorary Secretary, Agricultural and Horticultural Society of India.*

DEAR SIR,—In compliance with your request, I have had much pleasure in cleaning the Assam *kupas* received by the Society from Major Jenkins by my new machine, and have forwarded the same to the Society's rooms. The first bale which I received and which was marked "Mûttock," was, in my opinion, of longer staple and much superior to some of the same description and mark which Major Jenkins sent down on a former occasion to the Society,—and the machine separated the cotton from the seed much more rapidly.

The second small bale was marked "Naga," and had suffered a good deal from dampness before it reached me, having probably got wet in its passage from Assam; it was consequently not so easily separated from its seed as the "Muttock" cotton above alluded to, and a few rotten seeds found their way through the rollers.

Believe me, &c.,

IRON BRIDGE YARD: J. H. MATHER, *Civil Engineer,*
2nd April, 1849. *Suptdg. Govt. Cotton Experiments.*

To the Secretary, Agri-Horticultural Society of India.

DEAR SIR,—We beg you will submit for the opinion of the members at the meeting to be held this afternoon, the accompanying two samples of Moulmein grown cotton, one cleaned, and the other uncleaned. To give you a correct idea of the points upon which the Society's report is solicited, we refer you to the following extract from the letter of the parties who have sent round the samples to us.

"By this opportunity we have sent up to your address "two small boxes containing cotton of the growth of these "Provinces this season. One box contains unclean or seed "cotton, the other cleaned cotton—both being one growth. "Our object in sending it to you is to trouble you to get a "report on it as to its quality, and the probability of its "answering the English market. The uncleaned can be "purchased at 10 Rs. per 100 vis of 365 lbs. in town, but "up-country at 8 Rs. and even 6 Rs. per 100 vis. The "cleaned cannot be procured except in very small quantities "at 30 Rs. per 100 vis: this is considered a fair price for "cleaned when uncleaned is at 10 Rs. We find, out of the "uncleaned cotton only 33 per cent. of cleaned can be pro-"cured by the native *churka* in use here."

CALCUTTA: We remain, &c.,
12th March, 1849. EGLINTON AND CO.

Calcutta: May 19th, 1849.

The undersigned having been requested to examine certain samples of cotton as per memoranda below, beg to report as follows :—

A & A A *Samples of kupas and cleaned cotton, the produce of the Muttock country (Assam).*

Harsh, rough and coarse, but strong, clean and of fair color, adheres very firmly to the seed, and is of such very short staple as almost in our opinion to render it unfit for spinning. It might, however, be used for "quilting," "paper making," &c. &c. We think that, at present rates, it would not bring more than 2*d.* per lb. in England, and as the freight at £5 per ton of 50 feet would amount to 4-5ths of a penny per lb.! this cotton would not, at such rate, answer for exportation; but if worth 2*d.* in Liverpool, might, perhaps, be sent at £ 3.3 or say ½*d.* per lb. The cleaned cotton has been very well separated from the seed, and is free from stains.

B & B B *Samples of kupas and cleaned cotton from the Naga Hills.*

The same remarks apply nearly to this cotton as to A &A A, but it is if any thing harsher! From Mr. Mather's report, it seems to have suffered some damage.

C & C C *Samples of kupas and cleaned cotton from Moulmein.*

More soft and silky than the A A and B B samples, of rather longer staple, of good color and strong, but somewhat coarse. Adheres to the seed firmly, and is of too short a fibre to be readily saleable. If the former samples are worth 2*d.*, this would probably bring 2½*d.* to 2¾*d.* per lb. in the Liverpool market.

CHARLES HUFFNAGLE.
WILLIS EARLE.

Report on samples of the common Cotton of Province Amherst, Tenasserim.

Dear Sir,—I have the pleasure to forward for the purpose of being laid before the Agricultural Society, specimens of the common cotton of province Amherst, grown in the upper portion of the Salween river.

The specimens were obligingly procured for me by Mr. Burot, a French Gentleman residing here. He informs me, that the cotton meets with ready sale at Bourdeaux.

Samples marked Nos. 1 to 3 inclusive, are specimens of cotton cleaned with the ordinary *churka.* Sample No. 4 is cotton with seed. It contains cotton from four or five different places.

Maulmain : I am, &c.,
21st June, 1848. A. P. Phayre.

I have examined the 4 specimens sent to me, along with Captain Phayre's letter, stating that the cotton was grown in Province Amherst, and that Nos. 1, 2 and 3 have been cleaned by the common *churka.*

No. 1. General appearance good, and color good also—clean and free from stains, shewing that it has been carefully picked, and at the proper season; fibre weak (probably injured by the *churka).* The staple short.

No. 2. Very clean and of good color, not so fine and silky as No. 1, but I think with a longer and better staple.

No. 3. More woolly, but very similar to No. 2, perhaps not so carefully cleaned, but like the others, in my opinion, a very good sample of Indian cotton: all these samples resemble more "*Upland Georgia*" than any other description of American cotton.

No. 4. *Kupas*—staple short, and seed very difficult to separate from fibre.

Charles Huffnagle.

I concur with Mr. Huffnagle's remarks and opinion on these cottons, which are good and suitable for the English markets. Nos. 1 and 2 particularly so. I would recommend Capt. Phayre to send home specimens of the three. Have we any idea as to the cost of the production of such cotton in the Tenasserim Provinces?

J. Cowell.

The samples in question were sent to the East India and China Association, and the following is the report thereon :—

The samples of indigenous cotton wool, the produce of the Tenasserim Provinces, in the upper portion of the Salween River, sent to the Committee by the Calcutta Agricultural Society, are estimated more favorably than those before mentioned; they are of good color, very clean, free from leaf and seed, and of good qualities, but being almost destitute of staple, the wool is unfit for any purpose of manufacture except wadding, for which it appears adapted, and would meet with a ready sale, as considerable quantities are taken both here and abroad for that purpose. The value is considered to be about $3\frac{1}{8}$*d.* per lb.

By another gentleman it is stated, that No. 1 is of good color and clean, but coarse and light in staple, and valued at $3\frac{1}{8}$*d.* to $3\frac{1}{2}$*d.* per lb.

No. 2 is of a dull color, coarse and light in staple, valued at $3\frac{1}{8}$*d.* per lb.

No. 3 is of better color than No. 2, but coarse and light in staple; is valued at $3\frac{1}{4}$*d.* per lb.

Owing to the coarseness and lightness of the staple, points to which the chief attention of the spinners is directed, in scrutinising the quality of cotton, it is feared our manufacturers will not consider this cotton very fit to be spun.

On the manufacture of Cloth and Paper from the downy substance contained in the follicles of the Mŭddār (Calotropis Hamiltonii ?). Communicated by E. H. C. Monckton, Esq., *C. S.*

To the Secretary to the Agricultural and Horticultural Society of Calcutta.

Sir,—Though not a member of your Society, I have the pleasure, at the request of the Honorable the Lieutenant Governor of Agra, to send you the following specimens of cloth and paper manufactured from the cotton of the *Asclepias gigantea*,* class and order *Pentandria, Digynia,* commonly called by the natives *Mŭddār* or *Āg.* No. 1, is cloth of which the warp or longitudinal thread is made of common cotton, and the weft or crossways of pure *Mŭddār* cotton. Nos. 2 and 3, a specimen of jean, are cloth of which the warp is half common and half *Mŭddār* cotton, and the weft is three parts *Mŭddār* to one part common cotton.

No. 4, is paper as made in the jail, of the pure *Mŭddār* cotton. The seed was not properly separated in either specimen.

No. 5, is paper of which three parts are *Mŭddār* cotton, and two parts the pulp made from hemp such as the natives use for making paper.

No. 6, is a specimen of the uncleaned cotton. The above specimens were made by the people of this place under my directions, they are very coarse, but the spinners and weavers are not of the first order in these parts; it is to be hoped that, under better auspices, a better article might be made. The cloth takes dyes well of every description, but requires bleaching, which I have not the means of accomplishing

* The plant used by Mr. Monckton was most probably not the true "*Mŭddār,*" *Calotropis gigantea* of Bengal, but the "*Ak,*" *C. Hamiltonii,* which is the prevailing species in the arid parts of Hindostan, and a smaller form.—Eds.

except by the long process of exposure to sun and moisture.

Regarding the *Mŭddār* cotton, its glossy and silky nature, and comparative shortness of fibre, renders it difficult to spin alone, the mixture of from one-fifth common cotton and four-fifths *Mŭddār* cotton upwards, can be worked so as to be made practically useful. The specimen No. 2 is a good wearing cloth, and stands washing well.

As regards paper, the material in itself is so fine and clean, that it is almost ready-made to hand; it requires but little maceration to reduce it to pulp, and but little washing to clean it. As regards the separation of seeds, the cotton is given at once *uncleaned* to the spinners, these use a bow, which enables them to mix the *Mŭddār* with the country cotton: this process seems to be quite sufficient to separate the seed and dirt, and the *churkee* or any substitute for it, *is not required;* before being subjected to the bow, it is pulled out by the fingers, and slightly mixed in this way.

The *Mŭddār*, it is well known, grows all over India: it seems to thrive in soils that either reject or destroy every thing else. It is difficult to conceive anything less productive than dry sand, and yet the *Mŭddār* thrives in it. Should its cotton be found useful, the waste lands of India could be covered with it, as IT REQUIRES NO CULTURE AND NO WATER; it is also more productive than the common cotton plant, it comes to maturity in a year, and is perennial: so that once planted or sown, it is almost everlasting, at least for the purposes for which it is required. That it might, where thickly planted, be made the means of reclaiming poor soils, I have little doubt. The leaves, and mostly the upper branches, rot in the rainy season, while the root and stem remains, so that the soil, in a few years, would be much enriched by the decayed matter;—where it was an object to cultivate land occupied by *Mŭddār*, the plant might be burned and the ashes would act as a manure, and in places where wood

was scarce, the dried plant would make a good substitute for it.

The cotton makes a capital stuffing for pillows, and a lining, after being bowed, for *rezaees,* so that in the event of its not being wrought into thread, it could be used for these purposes at one-tenth at least of the cost of the common cotton which is now so used.

With regard to cheapness, there can be no comparison: in the first place, the whole cost of production is got rid of, the whole or nearly the whole cost of cleaning and separating the seed is avoided, and the cost of collection is much less, or at all events, not greater than that of collecting the common sort, and I do not think would average more than *a Rupee the maund* where the plant was abundant, so that this may be deemed its price. I am not quite prepared to say what is the loss by separation of seed; but I am inclined to think, that it is *very much less* than the loss in the common cotton, as in a maund of the better sort of the latter only 13 seers 5 chittacks of cotton are produced, leaving 26 seers 10 chittacks, or 2-3rds of *Binowla* or cotton seeds.

That there are sorts or species of the *Mŭddār* with which I am unacquainted (such as the white-flowered), I have no doubt, the staple or fibre of which would be better than that which I have used, and we all know that culture improves the quality as well as quantity of every plant, so that were public attention directed towards it, new species might be discovered, and larger pods with longer fibre produced.

Not having any silk or the finer kinds of wool, I have been unable to experiment upon them: any one who will examine the beautiful softness and silky appearance of the *Mŭddār* cotton, will see at once its value for mixing with silk and wool. There can be little doubt that it would blend with silk and fine wool into a delicate soft-textured cloth, and would be thus rendered a very much more valuable article than common cotton, and at the same time a fabric might be made

of a beautiful appearance and at a comparatively cheap price. A mixture might also be made, combining the *Mŭddār* cotton with the common sort, with the additions of both silk and wool; the object of course of such trials would be, to obtain the proportions that would give a good working material, as well as a brilliant article, at the cheapest possible cost.

I will not dwell on the difficulties I have had to contend with in the shape of ignorance and prejudice: what I have paid is no criterion of what the article could be worked for, and as yet the cost price is rather a fancied than a real one. The weaver whom I employ, however, tells me, that when the spinners are more used to it, the cost of spinning may be reduced to nearly what it costs to spin the common cotton. As regards the weaving, he is satisfied that it can, when a little more understood, be wove at the same or very nearly the same cost as common cotton.

Before weaving, it is necessary to steep the thread for four or five days in water, it is then steeped in the usual steep of flour mixed with water, with the addition of a little *Méthee* seed and the gum of the *Babool* tree, the two last in about the proportion of 1½ Rupee weight each to each seer of thread. The weaver tells me, that he is obliged to steep the common English thread in the same way before weaving, so that the only difference is, the addition of the *Méthee* and *Babool* gum, that costs about a pice or two.

There is, however, another view we may take of the importance of spreading the cultivation of the *Mŭddār*: it has been determined beyond all doubt, that trees and jungle attract moisture, that where these have been removed, the country that before used to be perpetually kept moist by rain has become comparatively dry, and that rain ceases to fall. If the large tracts, I may say immense tracts, of poor waste land throughout India were covered with *Mŭddār*, there is little doubt but that the rain would be more attracted and the

crops of the country derive benefit from it. So that look at the subject in whatever light we may, it seems pregnant with benefit. Thus the poor ryott could collect the cotton for nothing, have it spun at home for nothing, and have it wove into good warm clothing for a mere trifle, and he could line his *rezaees* and bedding for nothing.

The *Mŭddār* possesses several medicinal properties, and its charcoal is used in the Deccan for the manufacture of gunpowder. Dr. Cumberland, the Civil Surgeon of Etawah, has kindly furnished me with the following memorandum:

"The plant contains much milky juice, which externally "applied is useful in the cure of certain cutaneous diseases. "The rind of the root dried and powdered, is given in doses "of from 3 to 10 grains, three times a day, in the cure of "secondary syphilis, leprosy, and cutaneous eruptions of "various kinds; it is also said to cure the *Bursauttee* in the "horse, and I know that it has been given beneficially in "that disease, but the horse was not permanently cured."

There can be little doubt, that the cottony fibre of several other plants might be used for similar purposes, such as the cotton of the *Simŭl* or Indian cotton tree, but I consider that the *Mŭddār* is the most capable of being made generally useful: nevertheless, experiments might be beneficially tried regarding them in those districts where they abound.

ETAWAH: *10th October*, 1849.

P. S.—A copy of the Hon'ble Mr. Thomason's letter is annexed.

E. H. C. MONCKTON, ESQ., *&c. &c.*, *Etawah.*

MY DEAR SIR,—I have submitted to the Lieutenant-Governor your letter of the 25th ultimo, together with the specimens of cloth and paper made from the *Mŭddār*.

Mr. Thomason desires me to say in reply, that he considers the manufacture to be very creditable to your ingenuity

and public spirit; but is not able himself to judge of the value of the discovery, he would recommend your sending to the Agricultural and Horticultural Society at Calcutta, a full account of the whole process, as being the most probable means of drawing public attention to the subject, and of testing its real merits.

I remain, &c.,

SIMLA : F. C. MINCHIN,

5th October, 1849. *Private Secy., Lieut. Governor.*

Remarks on some of the Vegetable Products of the Tenasserim Provinces. By MR. H. FENWICK.

MY DEAR SIR,—I have this day forwarded you per steamer *Enterprize*, a packet containing some of the produce of this country, which I beg you will lay before the Society, with the accompanying notes, if you think they are calculated to prove interesting.

Before the accession of the Honorable the East India Company, the Tenasserim Provinces presented no feature calculated to prove of importance to the historian and nothing likely to interest the political economist: the barbarians, who were their inhabitants, lived but little removed in their moral and social character and habits from the beasts that surrounded them; like them, they depended, in a great measure, for subsistence on the spontaneous productions of the forests or soil, or on the results of ill-directed labor, weak efforts, scanty means and limited knowledge, and they were governed by a tyrannical and *unenlightened* Government who considered the pillage of its subjects lawful and right, and whose maxim is, that intelligence and wealth in the subjects of its empire is the sure sign of its approaching downfall. Since then, however, a happy change has taken place, and improvement has advanced with rapid strides; colonies have sprung up

where all before was barren and waste, and commerce breathes its healthful influence.

It was suggested some time ago by Captain Phayre, Principal Assistant to the Commissioner of the Tenasserim Provinces, I believe, in a pamphlet published by him in 1847, to form "A Society for agricultural purposes generally, but more especially for the increased culture of rice;" but not a soul responded to his call, all his endeavours proved futile, the *vis inertiæ* of the Moulmain public was not to be stimulated, excited or quickened, to such uninterested generosity, and the absence of the very spirit of enterprize, a total want of interest in the people of the land, aye, and the short sightedness of ignorance in a great measure, defeated the purpose of the philanthropist, and he was compelled to see a scheme fall to the ground which was calculated in every way to develope the resources of the country, and to benefit the community at large. I beg herewith to enclose you a copy of the pamphlet.

The patronage which the Government proffers is not mean, nay, the encouragement and aid they give is considerable; for a grant for 10 years of land, rent free, lands perhaps where hardly any trouble is required, is no small advantage: the means of agriculture again, are cheap, and the probability of profit is great. In fact there is every inducement of a reasonable kind for the outlay of a large capital on agricultural pursuits, with greater certainty of success than can, perhaps, be afforded by any other speculation. To prove however, that these are not unfounded theories, nor idle speculations, I will come at once to figures, to shew and prove, that the profits to be derived from the cultivation of paddy, are sufficient to tempt the cupidity, and to excite the interest of the most unspeculative mind.

The Burman method of cultivation is not, of course, to be thought of for a moment. It consists simply in having the ground trod down by buffaloes till reduced to a puddle, and

then scattering the seed broad-cast over the soil, there to grow, to vegetate, and to ripen. Some of them adopt a better method, *e. g.* after having puddled the ground as above, they cut off as much grass as remains, with long hatchets, called *daws*, and then plough the ground* up three or four times; this done, they scatter the seed, and sometimes transplant it from nurseries; 25 to 30 baskets is the average produce of such cultivations. You follow a more civilized plan, which we shall call the Madras plan, from whence it has come, as well as the plough used in it.

You should always have your grant secured to you by the end of February or beginning of March at the latest, if you can a little earlier, so much the better, as some time will expire in purchasing cattle and securing efficient men. We shall suppose you have done this, and that your grant consists of 400 acres of paddy land, 200 of which you intend to cultivate during the first year. You will then require one pair of buffaloes for every four acres of land, making in all 50 pairs; these, with a little care, may be purchased (I mean the female ones) for 20 rupees the pair, calves and all, but we will say 30 rupees. These secured, you next order 50 Madras ploughs,† which you will procure at six rupees each. Now you require 50 men, whose wages will be seven rupees each per month;‡ some trifling implements which I will put 100 rupees down for, eighty baskets of seed-paddy 25 rupees, and 385 rupees for a shed for the coolies. This is a very exaggerated estimate, but my object is to show, that at the worst, very worst, a hand-

* The Burman plough is a large rake, four feet or so wide, each spoke being of iron, four or five inches long, and as many wide apart, fixed to a bar from which rises the handle.

† The Madras or Ceylon plough is much like the Bengally, the difference is slightly in form, and in the share, which is wider, and enters six or eight inches into the soil.

‡ Thirty-eight of these men you dismiss say after two months, i. e. when the sowing has been completed. The remaining 12 you retain for the entire year, to milk your cows, carry them to graze, and weed the land.

some profit will, and must be derived from the cultivation of the paddy.

The entire cost then, of cultivating 200 acres of paddy, stand thus—

50 pairs of buffaloes with their young, at 30 rupees per pair, ...	1,500	0	0
50 ploughs, at 6 rupees each, ..	300	0	0
50 men for two months, at 7 rupees each, .	350	0	0
12 ditto for 10 do., at do. do., ..	840	0	0
Sundry implements, ...	100	0	0
80 baskets of seed-paddy, ...	25	0	0
Cooley's house, ...	385	0	0
Total, Co.'s Rs.	3,500	0	0

Every thing now ready, you wait for two or three showers to moisten the lands sufficiently to admit of your ploughing; and this obtained, which will be between March and April, you commence with your nursery, put down your seed, and begin general operations. By the time your land is fit to sow, your paddy will be fit to transplant; this done, you keep twelve men and dismiss the rest. The ground should be ploughed cross and re-cross at least four times. Nothing now remains but occasional weeding till the grain is fit to be cut, when, I am credibly informed by a gentleman* (from whom I have derived my information) who cultivates his own paddy in the above mentioned manner, that the produce at the lowest estimate will be fifty baskets per acre, he himself having sixty or seventy from his lands. Supposing we sell this at the lowest Arracan rates of 25 rupees the hundred baskets (my informant has sold his paddy to the Government at 30 and 37 rupees the hundred baskets), then there is the straw, which per acre will give 11 loads.

You have say thirty milch buffaloes in full milk, and twenty with young, giving you four quarts each a day, making 240

* Mr. Korkenberg.

quarts per day for all, or 7,200 per month, then you have your young buffaloes. Your returns will then be:—

10,000 baskets of paddy, at 25 Rs. the 100,	2,500	0	0
7,200 bottles of milk,* per month at 15 per R., is 480 Rs., or for 6 months ..	2,880	0	0
960 loads of straw, at the lowest 1 R. per load, ...	960	0	0
60 young buffaloes, ...	120	0	0
Total, ...	6,460	0	0

Thus you see, in spite of your expences, you have, after paying off your capital, a clear profit of Co.'s Rs. 2,960. The next year your expences will only be 1,190 Rs., giving you a profit of 5,270 Rs. But if you will remember, this is the produce only of six months, and that you have the entire winter in which to cultivate vegetables or winter produce, called the *Fussele Rubee*, which is equally profitable to paddy. For this your twelve men are sufficient, and I think 1,000 Rs. are not much to affix to the produce of 48 acres. You might dig a very good tank or two at a trifling cost, and you have abundance of cattle to water your fields: of course I am supposing, that in selecting your ground you will not choose all low land. Should you prefer to let your land rest (I do not know why you should), you may very profitably hire out your buffaloes to carters for the remainder of the season, or you could send them to the jungles to procure fire-wood, to be disposed of at the market, which yields a fair return. You have always occupation for cattle here.

Never cut your paddy close to the ground, but always about a span above: this plan has two advantages, for when the straw is dry, you set fire to it, and the fire destroys all the seeds of the grass and weeds that have fallen down, which

* I will even suppose that the cattle give no more, and that the quantity produced during the year averages from 24 quarts a day for each buffaloe for six months.

is the first,—and the second is, the manure which the ashes afford. And observe, never to keep your cattle (save during the rains for cold weather purposes) in one spot after the paddy has been reaped, but move them from acre to acre till the cultivating season comes, unless indeed you would take trouble after the manure, and adopt the European system, which is by far the best. This plan will supply your fields with an abundance of manure, though of an inferior quality, which will enrich the soil abundantly.

Here is inducement enough surely to the avidious, to the wildest calculator imaginable, and I need only add further, that were the crop entirely lost, the milk and the cold weather crop would completely cover the outlay—and what can any one want more? I might as well observe, that the ground will be assessed according to its quality, after the lapse of that period, the rent affixed being exceedingly equitable.

So much for the paddy. I trust I have not been tedious in enlarging on a subject of such importance: a few words more and I shall have done; thankful if I shall have awakened any interest on the subject, or induced any one to direct his mind to so important a channel.

The varieties of paddy grown here are but few, and the principal crops are of the *Loung-dee*, cultivated for exportation. It is a very coarse-grained article, but it is reckoned nutritious, and a great quantity is shipped for Penang, Singapore and the Madras Coast: the price of this rice, cleaned per hundred baskets and unbroken, of from 64 to 68 lbs. per basket, is Co.'s Rupees 60. There is, however, a better quality of rice called the table, which, though very coarse, is better a great deal than the former, and the price is 100 rupees the 100 baskets. No. 2 is a specimen of it. The broken rice, No. 2½ of this kind, sells for 14 Annas the basket.

The grain is freed from the husk in mills, constructed on a principle peculiar to this country: I shall send a sketch of it by the next mail. I am sure a steam-mill, such as they

have at Antwerp, or at Bordeaux, would bring a handsome remuneration to its owner.

Cocoanut, betelnuts, plantains, curry-stuff, and some other trifles are attended to, but regular cultivation they have none. Having placed the seed or plant in the ground, the Burmese think their duty performed, the rain, the soil, and their *god-(amas)** must do the rest. The Burmese women are, however, exceedingly industrious and active, and it is a fact worthy the attention of the philosopher, that whereas the generality of the men are dark and lazy, a great, rather the greater number of the women, are fair and laborious. The entire market is supplied and conducted by these ladies, all in their gay attires,—not a Burman attends to traffic of any kind, admitting an exception or two to the general rule, and those who do labor, are either the boatmen, wood-cutters, sawyers or thieves.† There are also a few writers attached to the courts.

The Chinese alone cultivate the vegetables grown here, which are principally as follows:—celery, lettuce, cabbages, white-radishes (like the Spanish), French beans, yams of sorts, pumkins, cucumbers, knol-khol, *dharus (Hibiscus esculentus)*, some *burbuttee (Dolichos Sinensis* and *Indicus)*, *poe-sag (Basella alba* and *rubra)*, *lal-sag (Amaranthus gangeticus)*, *chowly-sag (Amaranthus oleraceus)*, *chichinga (Trichosanthes anguina)*, *soa-sag (Anethum sowa)*, brinjal *(Solanum Melongena)*, sorrel, *kurrela (Cleome pentaphylla)*, and a few other trashy things that need no mention.

I visited a Chinese garden yesterday, and was very much pleased with its appearance, and the cleanliness it displayed. By the way it is as well to remark, that vegetables grow

* The Burmese idols are called *Godamas* by them.

† The chief occupation of the Burmese is to spend their days in sleep or idle chat, and their evenings in perambulating the streets or visiting their friends, segar in mouth. They are full of gossip at day, and pretty musically inclined at night.

best here in comparative shade, and it is adviseable to plant fruit trees all over your garden, to preserve the moisture of the ground. Of course it was contiguous to a water-course, well shaded, and abundantly manured and watered. The entire ground was divided into oblong stripes or beds, each about four feet wide, ten long, and four inches high, the soil richly manured above; the plants looked very healthy.

Any bit of iron serves them for a weeding hook.

Cauliflowers, turnips, carrots, beet, peas, &c. are seldom or never to be met with in perfection: when they do exist, of whatever nature, it is only in the gardens of Christians. You will be surprised to hear that peas sell, when procurable, for 3 rupees the vis; or nearly 1 rupee per ℔., when 100 acres of them might easily be cultivated yearly at a trifling cost.

I walked into the garden of the jailor, Mr. Thompson, this morning, in search of the *Passiflora quadrangularis*, and was agreeably surprized at the sight of a whole garden of cabbages, knol-khol, kale, red cabbages, and cauliflowers. The entire garden is about a third of an acre in extent, and there is a good well in it. The arrangement was certainly not very good, and the plants very inferior, but it is a rarity to see so many cauliflowers and cabbages together so late in the season, even in Bengal, and here it is a real wonder. I think the number would not fall short of 200, every plant was growing in a distinct hollow, (freely manured apparently with cow-dung,) for the reception of water, which is supplied them freely morning and evening, but the cabbages had not formed heads worth mentioning, and the cauliflowers had not flowered, nor will, except *nam ka waste*, their flourishing condition is entirely owing to the free supply of water and the richness of the soil, and I do not think Calcutta could, at this time, shew so healthy a crop of vegetables: the sowing must have taken place very late indeed, and it is a real pity that it will all come to nothing at last. Among the fruit trees I noticed

a lime, some plants of the *Durian* [*Durio zibethinus*] (which is spreading fast all over the country), two or three custard apples, a bullock's heart or bull's heart, *Anona reticulata*, some small cocoanut trees, and a long plumb,* all were in a very healthy condition, and as they are great rarities here, Mr. Thompson deserves much credit for the pains he has taken to introduce them into these Provinces.

The Burmese of the interior grow some sugar-cane, cotton, ginger, turmeric, chillies, &c. as do the Chinese also in their gardens.

No. 3 contains some leaves of the Coringa tobacco, and No. 3/1 and 3/2 are specimens of cheroots manufactured out of the leaf, the former by the Burmese women and the latter by the Coringa people. This tobacco comes from the Coromandel Coast, and is not only the best tobacco procurable here, but I think it a great deal superior to every species of the leaf grown in Bengal and Behar, *Bhilsa* inclusive. It is a very superior article indeed, and deserves the attention of the Society, to whom I strongly recommend it. The cultivation, as far as I can ascertain, seems to be similar to that pursued in Bengal, but I will not be sure, and shall strive to procure accurate information on the subject,† it only wants attention with reference to curing and packing to be equal in quality and flavor, perhaps not in scent, to the Sandoway: the price varies from 8 to 12 As. the vis. of 3¾ ℔s.

There is a very superior quality of tobacco, imported from Rangoon Proper, which is greatly in demand, and I am really sorry that I cannot procure a muster of it; when I can I shall send you some.

* The people about this place have no idea of pruning, and it is thought, to cut off the branches of the plum after it has borne, will destroy the tree.

† The Society might get very correct information regarding this tobacco from any of its members on the Coast, by simply expressing a wish on the subject.

No. 4 is a specimen of imported Chittagong tobacco, a very inferior article; the Burmese use it with their betel and in their cheroots, of which I enclose you musters. If you open one of these cheroots, you will perceive that the main portion of the stuffings consists of chopped wood, the tree from which this wood is taken is called *La-thow* (the *th* being pronounced like *th* in thing), it abounds in the woods. This wood is, when required, chopped like that you see, mixed with a sufficient quantity of molasses to render it glutinous, and then with a few chips of the Chittagong tobacco wrapped with the leaves. Large baskets of this wooded preparation are sold at the market daily. The cheroot should be smoked fresh, as the flavor is lost by exposure to the heat. I tried one or two on my arrival, but a saline taste peculiar to it rendered it impossible that I should relish it; all that the Burmese make is of apiece, their tastes are opposed to those of every nation under heaven. I have the pleasure to send you a specimen of the wood.

No. 5 contains the seed of a very peculiar species of the brinjal *(Solanum Melongena)*, this peculiar fruit grows to the size of an orange, and when ripe obtains the same color, it is very handsome indeed, and rather sour, but unlike the flavor of the *Tomato;* it is used both ripe and green in the shape of curries. It is grown on rich soil, shaded from the sun, generally under the shade of trees. The latter part of the rains is the proper time to sow the seed.

I am on the look-out for the seeds of the gigantic mustard, and for a species of the cucumber, which in appearance resembles the Bengal *Phooty*. The extraordinary features of this mustard is, that it grows to the height of a good-sized cauliflower tree, and has leaves of equal width and size. The Chinese are particularly fond of it, the leaves are only eaten, and a great quantity is pickled in salt (each tree being doubled into three folds and two across,) for use when the season expires.

No. 6 is the Burman bean; a very pleasant bean it is, much in flavor like the French bean. A great quantity of this bean is suffered to grow ripe for the seed, which is boiled, and makes no mean substitute for peas, to which its flavor is something allied. No. 7 contains the seeds of a fruit called in Burman dialect *Murium;* the complexion of the fruit when ripe is a pale orange, approaching to salmon, in size it is as large as a leechee, in flavor sub-acid, something resembling a half-ripe mango, and the tree grows to the height of forty feet, bears in four or five years, and when laden with fruit is very attractive. I have no doubt, but cultivation would make it a very desirable fruit, especially for the dessert table, as it is highly ornamental; at all events, it would, in its present condition, make unequalled tarts and jellies. I shall send you the flowers of the *Murium* when I can procure any, to enable you to identify it, (as my knowledge of botany is more than meagre)—it grows wild. No. 8 is called *Fansodee* by the natives. It is a good trifle for the dessert, more sweet than sour, pretty to look at, and plentiful in season: there is a peculiar feature attending some of these fruit trees, *e. g.* that while the fruit of those with the white seed, (which are less sweet) contain three divisions or flakes, the fruit of the red-seeded ones are only sub-divided into two equal parts. I dare say the entire fruit I send will give you some idea of the flavor. I have seen this fruit in a higher state of perfection on the hills of Cherra Poonjy, &c., and it is worthy of remark, that the wild mangoe, the leechee, the plantain called the *Docea,* the jack, and various other fruits, should be found in equal perfection or wildness at altitudes so various.

No. 9 is the bark of a tree and some rope manufactured out of it, which, though coarsely and rudely made, you will perceive is very strong and durable: it is extensively used here, and would, with a little more care, make excellent cables for ship use, I think it a great deal superior to the Bengal

Pāt, Corchorus capsularis; it is freed of its impurities in a manner peculiar to them, which I have not been able to learn yet. I shall however get the information as soon as possible; it is capable of much refining yet.

No. 10 are the fragments of the bark of a tree called *Thenaka* by the Burmese, and it is used by the Burman ladies to color their faces, as our *beaus* and *belles* use powder of potatoe, called hair powder. It improves the complexion in a great degree, and when mixed with the sandal wood, conveys a very attractive scent. The preparation is thus wrought: a slab of sandstone smoothly cut, being procured, the rough side or outer part of the bark is rubbed thereon with a little water till it assumes some consistency, this composition is then applied to the face equally and carefully until it dries, which it does in a few seconds, assuming a color white almost as chalk: the effect is very great, if the bark is rubbed a good deal, and the liquid then applied to a dark or black face. The masculine Burmese, some of them at least, during their new year, plaster themselves all over with this stuff, and look splendid frights (as they parade the streets), seeking whom they may devour. Those ladies who are pock-fretted, add to the mixture scrapings or rubbings of a valve of the oyster, which is said to remove the marks. The feminine Burmese carry their toilettes about with them when they go to their daily work; and when the day is over, the *napee** and the fish sold, their vegetable and fruit disposed of, and their other abominations changed for coin,—out comes the glass and the *thenaka,*—that applied, a cheroot is lighted,

* Almost every dish dressed by the Burmese contains some of this *Napee*, which is prepared in the following manner: A quantity of fish, almost putrescent, is put into a jar, with some salt, and suffered to rot, until it is crowded with maggots, it is then baked, worms and all, over the fire, and potted for after-use. They can nowhere live without *Napee* than others without fishes. A better and cleaner sort of *Napee* is prepared at, and procured from, Penang, by the Anglo-Burmese, which, though far superior, is still excessively unbearable.

the baskets or trays put on their heads, their gay *thamees** adjusted, and they wend home with a great deal of pride and no little effect.

No. 11 is the seed of a wild flower which accompanies: in its fresh state it is of bright scarlet, and grows in bunches of ten or twelve, the tree sheds its leaf after flowering, and the naked tree hangs laden with these rich clusters.

Among other things that are cultivated, and which I forgot to notice is, what the Burmese call *koon.* The betel *(Piper betel,)* is extensively cultivated and plentiful to a degree; very little care however is taken of the trees, they are neither covered nor shaded, but left exposed to the sun, and are only helped with a few poles on which to creep; this coarse treatment naturally makes the leaves very coarse, and rough-flavored. The best betel comes from Amherst, it is distinguished by the title of *Koke-mi,* and is both highly priced and prized. My opinion is, that the betel, from its very nature, should be suffered to creep on the ground, as it throws out roots at every joint, and not forced to creep on hurdles, &c. &c. The introduction of the *sanchee pān* into these Provinces would not be amiss.

The betelnut *(Areca catechu)* is cultivated or grown on a small scale; but the greater portion is imported from the Pedier Coast, Penang, &c.

Cocoanuts succeed very well in Moulmain, the soil and climate seem peculiarly adapted to this species of nut, and it is a pleasing fact that the natives seem to know this, for the country displays many young plantations of healthy trees, which promise shortly an abundant harvest. The cocoanuts grown here are a great deal larger than those produced in

* The *thamee* is a silken piece of cloth, wrapped in a single fold round the body, the silk is richly striped, and the lower part flounced, if I may say so, with silken stripes of silks of varied colors; this cloth comes below the breasts, to cover which, some reddish cloth is worked at the top, and this is folded above the chest.

Bengal. I strongly recommend that every encouragement be given to the cultivation of these nuts, that we be rendered independent of other islands, and save ourselves the expense of importation, in a few years. The Tenasserim Provinces may, in a few years, be the best mart for cocoanuts in the world, if sufficient capital could be found for the attempt, and if coolies were imported or emigration encouraged and aided by the Government, but as long as Government will leave to private exertion or individual enterprize the welfare of a people it is bound to benefit in every possible manner, so long will, I am certain, every hope of advantage to these Provinces be futile and vain, more especially as the Burmese are habitually lazy.

The Burmese cultivate no vegetable, if I may except the pumkin *(Cucurbita lagenaria)* and some other trifles and trash not worth noting, and yet they are the most herbivorous animals under Heaven, their entire diet consisting of vegetable and a little fresh or rotten fish: they are in their pristine state as yet, but one degree removed from their hairy brethren of Borneo, although they have a literature and a written character. Wild leaves, wild shoots, wild berries, and *napee* (without which no dish is sanctified), are all that they partake of.

The plantain is widely circulating all over Moulmain, the Burmese actually love the fruit as much as monkeys, though they generally eat the inferior kinds. It is perhaps worthy of note, that wherever the pine-apple attains to a state of perfection, there will the plantain thrive best: hence, in my estimation, a rocky soil is best adapted for its cultivation. I have seen a thousand feet of hill country covered over with luxuriant groves of the plantain, growing for centuries without cultivation and unwatered save by the streams of Heaven, and yet how fresh and how green were they; and that was the land of the jack, the orange, and the pine-apple, and there they grow to perfection, covering whole slopes of

mountain land, and luxuriantly in the richness of the valleys below with often scarce a foot of soil from which to extract nourishment. The best plantains we have at Moulmain are the *Kuny-massee* (a Bengal term), the Dacca plantain, and the *Ram-kela,* and they are very good indeed, although they may be said to be growing almost wild: the trees are never watered, the earth about them is never loosened, and during the hot season the soil is as hard as flint. It is enough for a Burmese to have been at the trouble of putting the seed or plant into the soil, henceforth he is exonerated from all further liability to exertion; toil who will, hereafter, Heaven or the women, his business is over, he will partake of the fruit if, and when, it bears.

Most things that grow not wild are planted round about dwellings, for no one is to be trusted, and hence the little produced; for very few houses have 50 feet square of unoccupied ground, very few indeed, one in a thousand (I allude to the Burmese of course): distinct cultivations there are few or none, and as to what are called gardens, are, I fear, land cleared of jungles, with a few of the wild mangoes, leechees, &c. &c. left thereon, and certainly such gardens do betray the actual taste, spirit, and feeling of their owners.

I might as well conclude my notice of the plantain with the description of an indigenous species, which will tax your credulity to no small degree. It is a monster fruit, a regular mammoth plantain, a *Musa segontia,* being in length upwards of two feet, and somewhere 6 or 8 inches in diameter, it is found on the Thoungeen and Attaran, and also in Burma Proper. My informant, whose credibility is beyond all doubt, is of opinion, that it would make capital provision for sea; the pulp, he observes, is firm as the sweet potatoe, and might be easily pounded down to flour, which could be converted into wholesome articles of diet. I am on the look out for an opportunity to procure some of the plants of this extraordi-

nary tree, should I succeed I shall send a few for the nursery of the Society.

Pine-apples abound in Moulmain, and the soil is exactly suited to them. The method of sowing is to cut the tops, and place them in some shady spot, never more to be interfered with, yet these pine-apples are inferior to none in flavor; there is nothing in Bengal like them, and they are barely surpassed by the acclimated Cape, though the vermillion complexion of the latter makes it a very desirable and ornamental fruit. These pine-apples are very rare here, but the country ones are in season procurable at from 6 to 8 per anna, they have been known to sell sometimes as cheap as 12 for the anna.

There is not a good jack in all Moulmain, they have every feature of wildness strongly marked, fruit small, flakes small, pulp ill-flavored and little, seed very large.

Mangoes crowd the fields, and are generally worm-eaten. Pumplenoes are sometimes to be had, as are also *Papias,* [*Carica Papaya*] which are not bad.

Lemons abound, very good and very cheap. The sweet lemon, which is as large as an orange, and grows plentifully in the neighbourhood of Akyab and Kyouk Phyoo, is to be had in tolerable abundance, and a very refreshing fruit it is, and very well flavored: at all events, it is no bad substitute for the orange. I wonder if cultivation could do any thing to improve it. I do not think cultivation has ever benefited the species *Citrus,* though I am certain it has often marred it: they have peculiar localities, and grow to perfection unaided by man, whose hand only seems to blight them.

The *Keshoo* grows wild all over the country, it is now in fruit, (this fruit is sold in the market when ripe, and is very well-flavored) it produces a flower the scent of which is very sweet, though rather wild.

The round plum or *Byre* is wild, plentiful and cheap.

The *Mangostein* is procurable in the months of May and June, it is brought from *Tavoy, Mergui*, and the Straits. Some people like the taste: it is not grown in Moulmein.

The *Durian* comes from the same place as the *Mangostein*, it is reckoned a great luxury by a certain class of epicures; its smell, as soon as the fruit is opened, is the most fœtid and abominable that one can imagine, but left exposed for half an hour this horrid effluvia evaporates, and a luscious substance is offered to the taste, which is said to resemble custard. The fruit both outwardly and inside resembles the jack, the tree is very handsome indeed, and propagation of it is being vigorously carried on: they sell from 8 to 12 As. each, it may not be unworthy of introduction in Bengal.

I have already told you that we have no flower gardens worth naming; plots variously laid out there undoubtedly are, but they are crowded with the commonest trash procurable, and I do not see that even they are properly attended to. All taste, all genius, shuns this place, or withers before its blighting influence: flowers that revive the soul alike of the savage and the sage, greet you nowhere except as a wonder, the commonest things are rarities here, and Edward's rose a flower of Paradise. A jessamin, solitary as "the last rose of summer," or a *Bale* [*Jasminum Sambac*] sighing amid the desolation around it, catches your eye as something truly astonishing, and you may walk many a mile and meet nothing to please the eye or delight the senses: and yet the Burmese love flowers, they pay large prices for them, and take every opportunity of procuring them to decorate their bodies with, but they must have them grown to their hands. We are half a century behind every thing bordering on civilization, and yet Moulmain has a tongue to trumpet her fame.

I have seen the *Passiflora quadrangularis* growing nobly here, the flower is larger than every species of the *Passiflora*, and very pretty to look at, but what is most extraordinary

is, that this creeper bears a fruit some inches long like a cucumber, pleasant to eat, and very good to preserve: when at Calcutta, I got a plant from the Botanical gardens, but it died.

The *Padouk*, a large timber tree, bears rich clusters of lilac flowers; the tree is crowded with these bunches, each of which is a bouquet in itself, presenting a very captivating sight. The timber of this tree is used in manufacturing your carriages, furniture, wedges, &c. The wood is of a dark color, very fine-grained, and excessively heavy, so much so, that it sinks in water, and is not consequently adapted for shipping. It grows to the height of thirty or forty feet. (No. 12.)

The *Amherstia nobilis* is a magnificent scarlet flower, the clusters are upwards of a cubit long, and very gay and gaudy looks the tree when in full bloom, I prefer it to the *Cordia Sebestena*. I shall try to procure a few cuttings for the Society.

The bamboos of the Tenasserim Provinces are the largest in the world, the diameters of some of them being as much as 8 to 10 inches: in the Botanical gardens is a very good bark or two, and a fine specimen is to be seen at the museum.

Of timber we have the following:—Teak (principally in demand), the *Padouk*, *Pengadoh* and *Anow* are amongst the strongest and most durable; the *Pemah* or red *jarool* of India, *Thengan*, *Meranen*, cedar and the oak abound; and the rose-wood, *Theetsee*, [*Melanorrhœa usitatissima*] cocoa, maple and ebony can be procured in abundance, with two species of pine.

The implements of agriculture manufactured by the Burmese are far superior in workmanship to any made in Bengal. I hope to be able to send you a few sketches of their implements of agriculture, &c. shortly.

The principal, in fact the only artisans and most useful and effective men in the country are the Chinese, they carry on a thriving trade, they manufacture articles of furniture, make

shoes, keep retail shops, are pork venders, have piggeries; are bakers and ship provisioners, in fact jacks of all trades. There are no pasturages in Moulmain, the cows are led to graze on the hills when the rain brings up the grass, they are otherwise fed with hay in their stalls: they are a miserable race, and very dear. Moulmain beef, equal to the very worst Calcutta, sells at 6 As. per vis.

Sheep are exceedingly scarce; you may judge of their value when I tell you, that a good piece of mutton sells for 5 Rs.; some kids are killed for the daily supplies, and they are exorbitantly priced. Fowls are moderately plentiful, i. e. there is enough to satisfy the consumption, affording a handsome profit to their owners. Deer's flesh is abundant and very cheap. Fish of all sorts in abundance and moderately priced, and game may be had sometimes.

I shall now conclude this lengthy communication, trusting to be able shortly to communicate to you information of a more accurate and interesting kind.

MOULMAIN: 16*th April*, 1849.

P. S.—I might as well tell you, that our exports are timber, principally teak, rice, kutch, some lac and bees' wax,—and our imports, spirits, wine, beer, oilman's stores, marine stores, mule twist, fancy articles, millinery, stationery, crockery and hard-ware, opium, indigo, iron and copper, gunny bags and cotton, horns, hide, jute, hot-spices, fire-arms, specie, potatoe, wheat, garlic, ginger, onions, *dall*, linseed, cocoanut and cocoanut oil, tamarind, segars, candles, and in fact every necessary for trade and life.

On Himalayan Coniferæ—being a Supplement to the " Brief observations," &c. Journ. of the Agri. and Hort. Soc. Vol. IV. Part IV.* BY MAJOR E. MADDEN, *Bengal Artillery.*

Having had opportunities since the publication of these notes, for additional enquiry and personal investigation, during several journeys into the interior of Kumaoon, Gurhwal, and Busehur, as well as the aid of several friends, I proceed, at the Editor's desire, to give the results in the order before observed. The references are to the paper as it appeared in the Medical Journal.

I. PINUS LONGIFOLIA.—The common hill name, *Cheer,* appeared to be simply the Sanscrit word denoting " bark," " rind," so conspicuous in this species: but further examination of Wilson's Dictionary proves its true origin to be " *Ksheerahvu* :" i. e. " named from its milk" or turpentine; an involved method of nomenclature, which is further exemplified in *Cupressus torulosa*, " *Soorahvu,*" " named divine," abbreviated, in like manner, in the vernacular of Kumaoon and Gurhwal, to *Soorüi. Cheer* is still used in Sindh to signify *gum. Sulla,* another well known mountain appellation of *P. longifolia,* from Nepal to Busehur, is apparently a corruption of the Sanscrit " *Surul,*" " straight," " erect ;" but not without reference to the root, *sri,* " to spread fragrance," which this tree does to a remarkable† extent. " *Kolon,*" " *Kolan,*" " *Kolain,*" variations of a common Gurhwal name, are undoubtedly from the same root as " *Kelon,*" the Cedar. *P. longifolia* is universally distinguished on the hither side of the NW. Himalaya as " *Sulla,*" " *Sullee,*"

* The first part of this paper, appeared in the Quarterly Medical and Literary Journal, N. W. P., No. 1, 1845, and was reprinted in the Society's Journal. The author has now favored the Society with the communication of the sequel, in original.—EDS.

† Both ideas are involved in the stanza of Calidasa, " Birth of *Uma,*" translated by Dr. Mill, J. A. S., July 1833, p. 338.

" His beauteous tall pines, when the elephants heal
By friction on them, the sharp twitching they feel
Athwart their big foreheads—a liquor distil
Of milky-white hue o'er each fir-covered hill :
Whose well-diffused fragrance makes every dark height
And table-land, pregnant with od'rous delight."

wherever the term "*Cheel*" is appropriated to *Pinus excelsa*. In Koonawur, however, *P. longifolia* preserves its name "*Cheer*," "*Cheel*," with the addition of the indigenous term "*Sthee*" or "*Shthee*." In Kumaoon it is known indifferently as *Cheer* and *Sulla*, but the latter is considered the proper Khusiya name. "*Siya-hee-ka-Sulla, Binsur-ka-Banj*," the pines of Siyahee, the oaks of Binsur, is an Almorah proverb, of which the point lies rather in the alliteration than in the nature of things. The tree occurs in the greatest perfection and abundance on both mountains, and, indeed, seen from any commanding elevation, outer and central Kumaoon and Gurhwal, north to the Pindur, from 2,500 to 7,000 or 7,200 feet elevation, appear little else than one great forest of *Cheer* pine, succeeded at that level by oaks. Like our Anglo-Saxon race, it is jealous of the presence of rival colonists; and these, like so many Celts or Red Indians, are driven to a distance, or to shady ravines, where the pine does not thrive.

In a synopsis of the Indian *Coniferæ*, at the end of his Himalayan Travels, Dr. Hoffmeister gives the limits of *P. longifolia* at 5,000 and 8,000 feet: but so far as the general line of forest is in question, this is certainly too high; though a few stunted trees may here and there even exceed that limit by a few hundred feet. As to the error in the lower limit, there can be no doubt. Dr. Griffith has already been quoted as fixing it in Bhotan to 1,800—2,000 feet: in Sikhim, where it only occurs in one place, Dr. Hooker informs me, that its upper limit is 2,000 to 2,500 feet: the Lepcha name is "*Gniet-koong*." At Ramesur bridge, on the Surjoo, in eastern Kumaoon, 1,500 feet above the sea, it descends within a hundred feet of the river; and in following the course of the Ganges from Hurdwar to Sreenugur, we first meet it on the floor of the valley at about 1,600 feet, near Seetakotee, 8 miles above Deo-pryag.* Now, though this may be nearly as much an extreme in

* Continuing our examination of the Uluknunda and its affluents northward, we find *Pinus longifolia* disappearing between Joshecmuth and Pundkesur at about 6,500 feet: on the Mundakinee, it ceases at about the same elevation a little below Goureekoond: a limit of fully 500 feet less than it attains on the central and outer mountains, and clearly indicating the severer climate of the interior, consequent on the vicinity and heavier fall of snow.

one direction as 8,000 is in the other, there can be no doubt of the tree being well established at 2,500 feet. It appears spontaneously at that elevation, or probably less, on the low range, corresponding to the Siwalik, which separates the Kotah Doon from the plains of Rohilkhund.

From Mr. Winterbottom I find, that though common outside on the Rujawur hills, *Pinus longifolia* has not penetrated into the valley of Kashmeer: knowing, therefore, the limit set by Nature to its upward extension, one is surprised in the Personal Narrative, and in the abstract of the flora of Dr. Hoffmeister's Travels, (pp. 360, 366, 405, 474, 510, 511, 512 of the English translation) to find *Pinus longifolia* entered at the very limit of forest on the Lamakaga, Harung, Nagkunda, and other Passes, associated with *Abies Smithiana* and *Webbiana*, *Corylus Jacquemontii*, *Syringa Emodi*, the shrubby *Rhododendrons*, and other sure indices of great elevation. The mistake perhaps originated in too implicit a reliance on the vernacular names, and in the travellers not being aware that the same term *Cheel* is used, in different districts, both for *P. longifolia* and *P. excelsa*. But that the latter is the tree intended would be manifest from the Journal alone, to any one conversant in the Koonawur nomenclature: for, p. 363, he observes at Chitkool, "the *Cheel* pines, here called *Limm*," *Leem* being *P. excelsa* amongst the Mongolian tribes of Koonawur, and in use down to Tibet, and *Byans* of Kumaoon. The oversight is duly corrected in Appendix I., addressed to Baron Humboldt, from Simlah, a few weeks prior to the author's premature and lamented death on the field of Feerozshuhur.

At page 495 of the same work we read, "In the valley of the Dudegaon (beyond Dhunpoor in Gurhwal), at an elevation of 6,800

When Mr. Vigne (Travels in Kashmeer, ii. 215,) mentions *Pinus longifolia* associated with juniper and black currant, near Suti Syn, in Baltistan, we must suppose him to mean *Pinus Gerardiana*. I shall have occasion in the sequel to remark on the frequent inaccuracy of this traveller in matters botanical. Either he or Baron Hügel, or both, speak of the lime tree as a native of Kashmeer: probably alluding either to *Grewia* or to *Celtis*.

Captain Hutton (Journal of a Trip through Koonawur, J. A. S., Nov. 1839, p. 908,) mentions "*Pinus excelsa* or *Cheel*" on the ascent to Gourakotee: but the tree here is *P. longifolia*, as correctly stated by Hoffmeister, pp. 472—501.

feet, again met with a tolerable thick forest of *Pinus longifolia;* and it is very remarkable, that the *Chamærops Martiana* (Wallich) is here in immediate contact with it, some tall stems of that palm being even scattered in among the pines." This requires confirmation: Dr. Hoffmeister very kindly furnished me with some memoranda of his observations on the Himalayan *Coniferæ,* in which the palm appears to be mentioned as *Phœnix humilis;* and as far as I have observed, it is much more likely to be this ascending to its utmost limit, than *Chamærops Martiana* descending to its lowest. Each is known as the "*Thakil*" in Kumaoon, on the NW. frontier of which *Chamærops* becomes rare; but on the Thakil mountain near Pithoragurh, in Shor, or SE. Kumaoon, *Chamærops Khasiyana* of Griffith, which seems a mere variety of *Ch. Martiana,* grows in abundance at 8,000 feet above the sea level, attaining a height of 50 feet, associated with yew, maple, holly, oak, hornbeam, far above the forests of *Pinus longifolia,* which clothe the inferior slopes of the mountain. The locality indicated by Dr. Hoffmeister, merits, however, further examination.* Colonel Kirkpatrick has "*Jugur*" as "a species of *Tal*" in Nepal: and *Chamærops Khasiyana* bears this name as well as "*Thakil*" in Kumaoon.

A curious phenomenon, yet unaccounted for, is observable in perhaps one-half the whole number of *Pinus longifolia* in Kumaoon. This consists in the spiral arrangement of the bark and woody fibre, the coils being sometimes as much compressed as those of an ordinary corkscrew, and in some instances the stem itself is thus contorted. This is attributed by the people to the action of the wind: but the phenomenon is apparently unknown in Gurhwal, &c., where the winds are equally violent; while in Kumaoon, we find specimens with straight and with spiral fibres mixed up in the same forest, and trees of other genera, in company with these, are never so affected, nor does the peculiarity extend to the *Coniferæ* of the upper ranges. A careful dissection under the microscope would perhaps

* A careful search in October 1849, authorizes me to assert, that *Chamærops* of any kind does not grow in the pine woods indicated: *Phœnix sylvestris* (var *humilis*) reaches up to 5,500 feet, and I doubt not is the palm seen by Dr. Hoffmeister.

shew it to be already present in the embryo. There is a strong prejudice against the use of the twisted timber, which may be well-founded where it is required for planks; but when applied unsquared for roof trees, it appears to stand well, bearing great weights for many years; nor in Kumaoon does the practice or the experience of the people at all bear out the very inferior estimate of the timber formed by some of our officers in Gurhwal; from the facility of obtaining it, little other wood is used in a great part of the province, where, with ordinary care, it is calculated to last a couple of generations. It is also employed to a considerable extent at Lodihana, Feerozpoor, and other towns on the Sutluj, and other rivers of the Punjab, down which it is floated from the mountains, but often of bad quality, and so extremely knotty, as to possess little strength: but better materials are not procurable. In Kumaoon extremely fine clean planks may be purchased to any extent, and at a very moderate rate.

On his journey to Manusarawur, Captain H. Strachey observed the importation of pine timber across the Himalayan Passes into Tibet,* naturally destitute of all arborescent vegetation: a fact which must be admitted to modify the justness of the observation, that nature has distributed her most inflammable materials to the coldest regions of our globe. The fuel of Tibet, brush-wood only, is not derived from the *Coniferous* trees, but from *Astragalus* and *Caragana* of the *Leguminosæ*, and from *Myricariæ* of the *Tamariscineæ*.

Pinus longifolia, with *straight* fibre, is distinguished in Kumaoon by the term *Sapin*, which is equivalent to the Sanscrit *Surul, straight*, a singular coincidence with the French *Sapin*, as *Kosee*, a legume, with *ecosse*. Such odd affinities in sound and sense are, however, more numerous than many imagine; thus our *Birch* seems identical with the Russian *Bereza*, and the Sanscrit *Bhoorjja*: the last form still vernacular in Chumba, &c.; but the etymology—"firm in the earth,"—is less probable than the allusion to its *bark*, perhaps conveyed in the German *Birke*. The coincidence of the Tibetan

* From the same traveller I learn, that chips of *Pinus (excelsa ?)* are imported from Poldar to Zanskar of Ludakh, where they are used for candles, and called *Lashi* or *Chanshing*, i. e. night-wood. So in Nepal, the knots of this, or *P. longifolia*, are cut into slips for torches, called *Diyaloo*.

Tanshing, with the German *Tanne*, must be accidental: the latter being allied to *tenuis*, and thus to the modern, "needle trees" of the same people.

The cones of *Pinus longifolia* open spontaneously in April and May; the tree is deciduous (nearly) in May and June, and has then a shabby appearance, assuming a rusty color, which, as well as the reddish-brown matting of the *pirol* or fallen leaves, may be recognized at a great distance. The turpentine is called *leesha* in Kumaoon. Ink is made in Sikhim from the charcoal of the burnt leaves, mixed with rice-water.—*(Dr. Hooker.)* The *Cheer* pine flourishes at Meerutt, Kurnal, Seharunpoor, &c., but the leaves droop considerably; and hence it is that Dr. Roxburgh, describing the tree from Calcutta-grown specimens, represents them with this position: but in the more bracing air of their native mountains, they are certainly rather erect than pendulous.

II. PINUS EXCELSA.—Under the temporary name of *P. pendula*, Dr. Griffith (*Journals of Travels*, pp. 211, 237, 239, 264, 265, 287, 293, compared with Journal of Asiatic Society, March 1839, pp. 217, 218,) describes this species as being common in Bhotan, forming large and beautiful woods on southern aspects, next above *P. longifolia*, and below *Abies Smithiana*, or from 6,000 to 10,000 feet, but becoming stunted at this last elevation. This is the species, No. 398, page 123 of Dr. Griffith's Itinerary Notes. In Nepal it is stated to occur at Narainhetty and Bunipa, (probably planted) and wild on Sheopoor and Gosainthan; but Dr. Hooker has not met with it in the eastern part of that country or in Sikhim. We next find the tree in Byans, on the Upper Kalee, where Kumaoon borders on the Nepal province of Dotee; here it is common, and was found by Captain H. Strachey, under the Khusiya name *Raisulla*, and the Bhotiya *Lumshing*, identical with those given by Loudon, *Lamshing* and *Raesulla*, the former being the *Leem* of Koonawur; and *Raisulla* (applied in lower Kumaoon to the black fir and cypress), denoting "king of the pines," as *Raibanj* or *Reeanj*, king of the oaks *(Quercus lanata)*, may possibly have led to the specific name *excelsa;* which Dr. Hoffmeister misunderstands of the stature instead of the site of the tree. This, he says, "is most unworthy of its name, for specimens of more than 40 to 50 feet in height are

great rarities." Large woods, no doubt occur, in which many of the trees are about this height; but Don mentions 90 to 120 feet as the stature; between the Shatool Pass and Panwee, as well, as below Chansoo in Koonawur, there are magnificent forests, containing many trees, certainly not under 150 feet.

P. excelsa appears to be wholly wanting in central and NW. Kumaoon. In Gurhwal, native report places it on the great mountain Rikholee Goodree, (a spur from Trisool) and about Kunol, near Ramree; but it has not been observed, so far to the SE. by Europeans. Lt. R. Strachey and myself first came on it below *Abies Smithiana* and *Picea Pindrow,* on the descent from the Pilgwenta Pass to Josheemuth, between Toongasee and Mirg, whence it occurs on the mountains on the south side of the Uluknunda, as far down as the Patal Gunga, behind Lungsee Ghat. Dr. Jameson, Lt. R. Strachey, and Mr. Commissioner Batten, inform me that it continues thence up the course of the Dhoulee, and is the uppermost and only pine met in the ascent of the Neetee Pass; the latter observer fixing its upper limit near Bumpa at 11,800 feet, and stating that it is not unlike the *Cheer at a distance (J. A. Society,* April 1838, p. 312). In Dr. Hoffmeister's travels, the first mention of it in Gurhwal is on the Kaleekhal, a spur of Toongnath, associated with *Abies Smithiana,* and below *Picea Pindrow.* The same traveller states it to be the uppermost pine on both the north and south face of the Lamakaga Pass, leading from the Ganges to the Buspa, reaching up to 11,500 feet on the former, and 8,500 feet on the latter side. On the Harung Pass, behind Sungla, he describes it as occurring 600 feet above *Picea Webbiana,* growing with *Rhododendron campanulatum.* Between Jaka and the Roopin Pass I observed it associated with the lowermost specimens of *Picea Webbiana;* and while the authorities just cited for Gurhwal are sufficient to justify the epithet *excelsa,* the mass of the species in Busehur is certainly below the silver fir. Captain A. Gerard fixes the limits near Simlah at 7,006 and 8,425 feet, and this estimate was adopted generally in the Journal for January 1845, but he himself gives 12,140 feet as the superior limit on the snowy range of the Leem, which is the same tree. On Muhasoo, near Simlah, it reaches nearly 9,000 feet, and on Kumuloree, behind Nagkunda, 9,500—10,000. At Kot-

khaee it abounds at 5,500; and along the Beeskool stream, below Deorah, in Joobul, it may be traced, mixed with alder, nearly down to the Pubur, opposite Raeengurh, probably its lowest site, being little more than 5,000 feet above the sea; and here only on the shaded side of the mountains. Dr. Griffith (p. 239,) once observed it in Bhotan, mixed with *P. longifolia* as low as 5,400 feet. We may therefore fix on 5,000 and 12,140 feet above the sea-line as the extreme limits of this species. We have no accounts of its presence beyond Buschur till we reach Kashmeer, whence Mr. Winterbottom traced it to the mountains of Gilgit in latitude 35½, its most northern habitat hitherto ascertained, as Bhotan in 27°, is the most southern. Dr. Griffith *(Itinerary Notes,* p. 329,*)* states it to be common on the mountains of Kafiristan, north of Julalabad; west of which meridian it has not been traced. The Kafir name is *Piunee.*

Pinus excelsa seems to prefer the more cheerful aspects of the mountains, provided they do not face due south. It flowers from the end of April to the middle of June, according to the elevation and exposure: the cones are erect while young, and are about an inch long in October; by April following they are 3 to 4 inches in length; and altogether require 18 months to mature. In the allied American species, *Pinus strobus,* Lord Weymouth's pine, the seeds fall in October of the second year. The cotyledons of *P. excelsa* average about nine, *P. longifolia* about twelve.

On the northern side of the Roopin Pass many specimens may be noticed of *P. excelsa* with bright green leaves, which, on others, are mingled with foliage of the glaucous green, proper to the tree on the lower mountains. Dr. Griffith, also, observed some variation; for at 9,500 feet he mentions (p. 259) mixed with *Abies Smithiana,* a "species *very like Abies pendula*"; the difference consisting in the *erect* leaves; *(Itinerary Notes,* p. 149.*)* And in Nepal, Dr. Wallich observed a variety which he thought to come nearer *P. strobus* than the usual one *(Royle's Illustrations).*

I have already remarked, that in Busehur, wherever *P. longifolia* is known as "*Sulla,*" *P. excelsa* takes the name of "*Cheel,*" which in Joobul, &c. is variously modified to *Cheeltoo, Cheetoo, Cheeoo.* In Gurhwal it is called *Cheela.* Baron Hügel mentions that in Kashmeer the *Kair* fir is preferred for burning lime; this is pro-

bably the local form of *Kael*, *P. excelsa*, which in Busehur is equally esteemed in the preparation of charcoal for the smelting of iron ore. At Almorah, the bark of *P. longifolia* is employed for this purpose.

Dr. Hoffmeister states, that "*Kel*" is used on the Sutluj above Rampoor, for *P. longifolia*, and quotes Professor Wilson as authority for the signification "a sort of pine"; a definition not to be found in the Sanscrit Dictionary of 1832. The vernacular term was perhaps "*Kael*," *P. excelsa*.

III. Pinus Gerardiana.—"*Rhee*" and "*Shungtee*," are the names by which this pine is known in Busehur and Lower Koonawur: further down the Sutluj, where however, the tree is not found, it appears to be called "*Newr*," perhaps a corruption of *Neoza*, but properly *Juniperus excelsa*. The Tibetan race of Hungrung and Shipkee know it as the "*Kuminche*" and "*Koneeunchee*," cognate with "*Konecha*," "*Kolecha*" of the Joohar (Juwahir) Bhotiyas, who only know the tree by report, and occasionally receive the seeds from the west. No allusion is made to *P. Gerardiana* in Dr. Griffith's journey to Bhotan, nor has Dr. Hooker found it in Sikhim or eastern Nepal; the most southern habitat appears to be the forest between Mularee and Bumpa, on the route to the Neetee Pass, in which Dr. Jameson observed several specimens, truly wild, in 1846. The climate and flora of that locality are similar to Koonawur. Dr. Falconer informs me, that it is abundant between Astore and Iskardo, in little Tibet. Mr. Winterbottom found it as far north as Gilgit, in 35½°, a fact which forms a strong link in the chain of evidence to identify the *Neoza* with the *Chulghozeh* or *Julghozeh* of Kabul. Dr. Griffith (*Journals of Travels*, 457, 461) mentions the latter at Tezeen, in Afghanistan, and says, it exists, but rare, in the Siyah-posh Kafir mountains above Chugur Serai, north of Julalabad; where its occurrence on the *outer* ranges, indicates their exemption from the periodical rains. Masson (I. 222,) informs us, that the mountains near Nijrow, in the Kohistan of Kabul, are covered with *Chulghozeh* pine, and beyond this point I know no record of its having been observed. Enough is shewn to prove that Dr. Hoffmeister's limitation, "grows on the Sutluj only," is to be understood solely of the British Himalaya; and even then, with the reservation of the Neetee examples. He fixes its vegetational limits at

5,800 and 9,400 feet, the last apparently from a single observation near Mebur, on the north side of the Harung Pass. Capt. A. Gerard states its highest limit on a southern exposure of the inner Himalaya (near Murung) to be 10,849 feet, but (*Tours of Lloyd and the Gerards*, p. 264,) in another place he expressly fixes it as high as 12,300. This locality, near Soongnum, is no doubt its extreme limit; the usual range he states (p. 273,) to lie between 5,500 and 10,800 feet. It is very generally associated with *Cedrus Deodara.*

Pinus Gerardiana, on the right or north bank of the Sutluj, does not extend to the west of Meeroo; on the south it is first met with a few miles above Wangtoo bridge, occurring abundantly on the rocks and cliffs from Melum (Melung of the map,) upwards, and along the course of the Buspa, nearly to Sungla; the inferior limit agreeing with that assigned by Dr. Hoffmeister. When young, and on a tolerable soil, the *Rhee* grows in a conical form, pretty much with the habit of *P. longifolia*, to the height of about 50 feet, furnished with numerous horizontal branches nearly to the ground: but in the situations which it best loves, rocks and bleak-riven crags, the boughs become excessively crooked, and are twisted in every direction. The exterior bark is of a silvery grey, falling off in large flakes, and never, as Dr. H. observes, transforms itself into the rough outer coating of the other pines; the inner layers, thus disclosed, are, at first, green and smooth like the epidermis. The foliage is of a blackish-green; the leaves, in bundles of three, with deciduous sheaths, are acute, flattened, from 4 to 6 inches long. The scales of the cone have the ends thickened, are broader than those of *P. longifolia*, with a less abrupt beak, and are without the boss at its top which marks that species. In the warmer sites, the seed ripens by the end of September, but higher up, not till October; the cones of last season still hanging on the branches. It arrives at Simlah for sale in the latter half of November.

"*Sunoubur Sukkur*," supposed (p. 43,) to be equivalent to "*Pistacio Pine*," is correctly written *Sunoubur Sughar*, and signifies "*Lesser Pine*," an apt name enough for *P. Gerardiana*, the stature of which probably never much exceeds 50 feet.

Pinus Cembra, p. 45. Erman (*Travels in Siberia*, ii. 512) remarks the curious fact, that this native of Switzerland re-appears in

Siberia from the eastern slope of the Ural to the Lena; near Okhotsk he found the *Kedrovoi Slanetz* or *P. Cembra,* var *humistrata*, the elastic stone-pine or spreading cedar of eastern Siberia, which has several stems twelve feet high, and three inches in diameter, erect in summer, but completely prostrated by the snow in winter. The cones are but half the size of *P. Cembra,* with nuts of equally good flavor.

The name *Cembra* is vernacular in Dauphine; the German is *Zirbel:* the Swiss *Arve, Arbe, Alvies* and *Arth;* the Russian *Kedr, Kedrovoi,* has probably been applied under the idea that it was the cedar; the tree is nowhere indigenous to Russia, and cannot have had an original Sclavonic designation.

There is a fourth species of *Pinus,* hitherto unnamed, on the Khusiya hills and on the mountains of Upper Assam, which from the form of the cone, and the locality, seems to be the *P. Nepalensis* of Dr. Royle, (*Illustrations,* 353,) and of the Arboretum Brit. iv. p. 2236, f. 2117. It resembles *P. sinensis,* and is thus described by Dr. Griffith (*Itinerary Notes,* p. 58, No. 901) Pinus Icon. 46, 47. Circa Moflong. Arbuscula, juniores tantum formosi, seniores always scraggy. Circa Nungklow, præcipue in descensum. Arbor 50-60 pedalis trunco stricto, ramulis asperis foliorum cicatricibus, basi novellorum squamatis, squamis reflexis, foliis ternatis, (vaginis membranaceis,) acerosis supra planis, infra convexis, spithamæis; infimis sub-pendulis, summis sub-ascendentibus; intermediis nutante cernuis. Conis sessillibus, ovatis, curvatis. Amentis masculis brevibus, vix uncialibus, ascendenti, curvatis; fæminæis pedunculos, bracteato-squamatos, terminantibus.

"Intermedia inter *P. longifolia* et *P. sylvestris* cum habitu accedis."

Through the kindness of Dr. McClelland, I have seen the figures and specimens referred to; the former, however, represent the leaves as binate: which may be a proof of the identity of the plant with *P. sinensis,* which, according to Loudon's Supplement, has leaves in threes, sometimes in twos. Dr. Falconer, Superintendent H. C. Botanic Garden, has excellent specimens from the mountains of Upper Assam, sent by Major Jenkins. The leaves are filiform, in threes from 5 to 7 inches long, with rather long sheaths. The

cones are often in whorls of 4, sometimes 5; of a broad ovate form, and with short stalk: they are from $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long, the squamæ oblong, obtuse, thickened at the end, but without beak.

Along with the above, among Dr. G.'s specimens, is one with binate leaves, 4 or 5 inches long, the sheath short: it is without fruit. In the Residency Garden, Kathmandoo, Mr. Winterbottom observed a scrubby looking pine, about 30 feet high, with leaves in pairs, of the length of *P. sylvestris*, (i. e. $1\frac{1}{2}$ to 2 inches,) and very persistent ovate cones, about $1\frac{3}{4}$ inches long, the scales furnished with a straightish or somewhat upcurved prickly beak. Mr. W. could not learn whence it came, but it would appear to be *P. pinaster*, var *Nepalensis*. The cones, however, were not in whorls.

On the mountains between Moulmein and Zimmay, NNE. of the former place, in lat. $18\frac{1}{2}°$, long. $98\frac{1}{2}$, Dr. Richardson (*J. A. S.*, October, 1836, pp. 612, 621,) mentions a species of pine forming fine open forests, and, like *P. longifolia*, allowing no other tree in its neighbourhood. Some of the specimens measured 8 or 9 feet in circumference, and were "much taller and straighter than the same trees in Europe." Though no clue is afforded for its identification, there is every reason to believe it to be the species at present known as *Pinus Latteri*, of which a short notice appeared in the J. A. S. for January, 1849, from a specimen obtained on the Thoungyeen river on the Mergui frontier, in lat. 17°, at an elevation above the sea of 1,000 to 1,500 feet. Drs. Falconer and McClelland possess specimens from the same district; Dr. McClelland's being supposed by Mr. O'Reilly, who transmitted them, to come from an elevation of between 3,000 and 4,000 feet. It apparently belongs to the *Pinaster* section: and the striated leaf, described by Mr. Masson, may be observed on *P. pinaster*; and still more prominently in *P. Lambertiana*, as figured in Loudon's Supplement. *P. Latteri* has the leaves in pairs, from 5 to 7 or 8 inches long, with sheaths of half an inch. The cones are short-stalked, oblong-ovate, 3 to $3\frac{1}{2}$ inches long; the scales thickened and rhomboidal at the end; beakless.

Dr. Falconer informs me, that the timber has been pronounced by Mr. Seppings to be equal to the best Norway spars for light yards.

IV. Abies Smithiana.—Under the name of *A. spinulosa*, (*Journals of Travels*, pp. 259, 265, 275, with Journal of Asiatic Society, March, 1839, p. 223,) Dr. Griffith describes this spruce, as growing abundantly on the northern ranges of Bhotan, from 7,800 to 11,600 feet above the sea (*J. A. S.* but only to 10,500 in the Journals;) —preferring north faces, and in mass occurring next below *A. Webbiana (densa)*. Dr. Griffith's specific name is a translation of "*Kundrou*," a common vernacular term about Simlah. It is rare in Sikhim; and confined to vallies of the inner range at 8,000 to 9,000 feet, mixed with *Abies Brunoniana*, and seldom exceeding fifty feet in height. In the Lachen valley alone did Dr. Hooker find it abundantly, but never large. The Bhotiya name is *Téé*. Loudon (*Supplement to Encyclopædia of Plants,*) gives Kumaoon as its habitat, but I have been unable to detect a trace of it in the province; it occurs nowhere in Danpoor and Joohar, along the snowy groups of Nunda Devee and Nunda Kot; nor were Bhotiyas of Milum, accustomed to traverse the mountains, able to recognize the cones or dried specimens. Natives of Budhan have assured me, that with *Pinus excelsa*, it is indigenous on Rikholee Goodree, and about Kunol, near Ramree, but the nearest point to Kumaoon, where credible (European) testimony vouches its presence, is the descent from the Pilgwenta Pass, Pilcoonta hill of the map, to Josheemuth, where Lieutenant R. Strachey and myself found it at 8,000 to 9,500 feet, mixed with *Picea Pindrow*. Captain Raper (*As. Res.* xi. 518, 547,) found it abundantly in the same district, under the name *Realla;* as did Dr. Jameson and Lieutenant Strachey, in the valley of the Dhoulee, between Mularee and Bumpa.

Below Josheemuth, I observed it on the mountains above Helung and Punkheemuth, on the south side of the Uluknunda: and above Josheemuth, it is common on the heights and crags which form the tremendous defile of the Vishnoo Gunga, descending to the level of that river, near Lambugur, at about 7,000 feet. The people of all this part of Gurhwal confound it with *Abies Pindrow* under the common term "*Ragha*:" this name is given by Dr. Wallich, Plantæ Asiat. Rar. iii. 24.

Dr. Hoffmeister first met it under the names *Rai, Raisulla,* on the spurs of Toongnath, (where, however, I did not observe any);

and onward, opposite Reital, on the Bhagiruthee, he found it descend to 6,500 feet, at which level indeed, but only in the most cool and shady spots, a few small specimens may be observed near Kymthoo (Annadale), north of Simlah. Dr. H. fixes 10,000 feet as the upper limit, and describes the tree as growing on the Harung Pass, 500 feet above the *Pindrow*, which seems an exception to the general rule. Mr. Winterbottom informs me, that it is common (above the cedar forests) with *Picea Pindrow* and *Pinus excelsa*, on the mountains of Kashmeer, beyond which it stretches to Gilgit and Chugur Serai; we have no evidence of its existence further north.

Abies Smithiana is known to the people of Rol, near the Shatool Pass, as "*Bhooj-rai*," and to those of the Roopin valley, as "*Bung-rai*;" in Joobul it is called *Row, Koodrow, Koondrow*, probably the *Khutrow* of Dr. Royle, all denoting the "prickly fir." *Kund .w* is also applied in Joobul to *Picea Pindrow*, the more correct local name of which, "*Chilrow*," is then transferred to *Abies Smithia a*, as "*Khurok*" is in Koonawur. Multæ terricolis linguæ, cœlesti una: the Babylonian confusion of the Vernacular may reconcile mortals to the unity, however hard, or sometimes barbarous and pedantic, of the botanist. The difficulty is older than the time of Pliny, who was as much puzzled to identify the Greek as we are the Himalayan pines, for he tells us, that "in Macedonia, et Arcadia, circaque Elin, permutant nomina, nec constat auctoribus quod cuique generi attributant: nos ista *Romano* discernimus *judicio*." The Roman interpretation of another set of Greek words has since deluged Europe with blood! and so difficult is it permanently to connect names and things, that the *Pinus sylvestris* of the Roman naturalist is our *Pinaster*, our *sylvestris* being his *Pityada*; by *Pinus*, simply, he always intends *P. pinea*, the stone-pine, the *Pitiis* of the Greeks, from *Pitta*, pitch. By restricting the term "fir" to the spruces, and "pine" to *sylvestris*, we are ourselves forsaking the analogies of our own language, for the German *Fohre, Fuhre*, the origin of our word, is *P. sylvestris*, allied perhaps to *pür, fire, &c.* The etymology of the terms *Re, Rai, Row, Rohow*, so generally applied to the Himalayan spruce, may be sought rather than found in the Sanscrit *rohi*, a tree: *ruh*, to grow as a seed: *ri*,

to move: *ru, reh,* to sound: or perhaps, considering the form of the tree, and the name "weeping fir," which that form suggested to our early travellers, the root *roo,* to weep, may be accepted as a plausible derivation.

Loudon (*Arboretum Britannicum*) has noticed and explained the errors of the Penny Cyclopædia, in its description of *Abies Smithiana,* which were remarked in my original paper, p. 47: he says "some confusion in the description of this species in the Penny Cyclopædia has resulted from the cones in Dr. Wallich's figure being placed upright, which, if they had been actually so, would have constituted it a *Picea,* and accordingly Dr. Lindley calls it Indian silver fir." Mr. Loudon was himself not exactly correct in describing the leaves "straight;" they are somewhat curved; "sub-incurva," Wallich, whose plate (246) rather exaggerates their thickness.

Abies Smithiana flowers (Busehur) in April, with solitary strobili; and immediately afterwards exhibits numerous cones, rapidly enlarging to a few inches in length; and, from the bud-like scales remaining at the base, having every appearance of being just developed; in this case the seeds only require 7 or 8 months to ripen, a fact which may be in some way connected with the very perishable nature of the timber. Nevertheless, this rapidity of fructification is still more decided in *Quercus semecarpifolia,* which flowers in April, May, and matures its fruit in July, August, when the beautiful large globular acorns fall and germinate at once; yet the Khursoo timber is considered excellent, and the name, which is universal in the Himalaya, appears taken from its being used in ploughs.

Abies excelsa, the Norway spruce, flowers in May, June, and though the seeds naturally do not fall till next spring, Loudon states that the cones may be gathered as mature any time between November and April, which reduces the period of gestation in both these spruces, in common with some others of the *Abietinæ,* to a period of six or eight months.

In *A. Smithiana* the young cones are at first upright, and the position assigned by Dr. Wallich may have originated in his having found them only at this stage; but from their own weight, and the slenderness of the branchlets, they soon become pendulous. The

very beautiful tender green shoots, as they elongate in April and May, carry before them like an extinguisher, the brown transparent scales of the leaf-buds; owing to a blight of some kind, the young leaves frequently turn a rich orange color. The twigs, &c. are in general use in Joobul and other states as litter, and thus form good manure; and the shepherds of the higher mountains are accustomed to carve out great cantles of the bark of this species and of the *Pindrow* to roof their shielings, and also to serve as water-troughs for the cattle; full many a noble tree is destroyed in this way. But, excluding all consideration of the part which it probably plays in meteorological phenomena, the principal end and design of the Himalayan spruce, like that of the lilies, which neither toil nor spin, is to be sought in its extreme beauty. Loudon mentions a Norwegian variety with pendulous branches, which must resemble it closely: and Spenser's allusion to the Norway spruce, as "the fir that weepeth still," recals Captain Raper's distant and independent "weeping fir" of the Gurhwal Alps.

Abies excelsa is the *Picea* of Pliny, "distinguished *tonsili facilitate,* by its fitness to be shorn, which agrees with the spruce fir, whereof I have seen close shorn hedges."* Loudon also informs us, that it differs from most of the *Coniferæ* by its property that, where the extremities of the lower branches touch the ground, they readily take root, and originate new trees.

Captain Hodgson (*Gleanings in Science,* February 1830, p. 52,) measured a fallen Rai fir, exceeded by others standing near it, and

* Bishop Berkeley's "Siris, a chain of Philosophical reflections and enquiries concerning the virtues of tar-water," and theology. His method of preparing the former is this. Pour a gallon of cold water on a quart of tar, and mix them well with a spatula for 5 or 6 minutes: let the vessel stand closely covered and unmoved for three days and nights; then skim the water, and pour it off unshaken into bottles, which are to be well stoppered. The Bishop's theology has outlived his tar-water. The Greeks used and still use (Hoffmeister, p. 18) tar-wine, a more generous but a less virtuous potation, which will perhaps survive the theology. "Jonstonus, in his Dendrographia, observes that it is wholesome to walk in groves of pine trees, which impregnate the air with balsamic properties." Siris: none more so than *P. longifolia:* but the dry air and soil selected by pines are more probably at the root of the salubrity.

found the length 169 feet. The following dimensions in girth at 5 feet from the ground give a general idea of the size attained by *Abies Smithiana,* and agree with that assigned by Dr. Hoffmeister in Gurhwal, towards Gungotree:

No. 1	15½ feet,	On Muhasoo, near Simlah.
,, 2	14 ,,	
,, 3	13½ ,,	
,, 4	17⅔ ,,	Near Nagkunda.
,, 5	16 ,,	
,, 6	15 ,,	
,, 7	20 ,,	North-east face of Choor.
,, 8	19 ,,	
,, 9	14½ ,,	
,, 10	19 ,,	Below Rol villages.

The unfavorable influence of the southern exposure on vegetation, noticed pp. 49, 50, is thus confirmed and explained by Baron Hügel, with reference to the valley of Perhamgala, in the Peer Punjal Range, (*Travels in Kashmeer,* English translation, p. 88.) "Strange to say, the south side (*aspect?**) of the valley is every where wild and dreary, while fine trees grow up to the very summit of the mountain on the north face. The reason may possibly be found in the fact, that on the south side the repeated action of alternate freezing and thawing destroys every kind of vegetation except a few grasses." Erman (*Travels in Siberia,* I. 76, 77), who remarked the same fact in the coldest parts of Siberia, where, at three feet depth, the soil is perpetually frozen, notices the increased luxuriance of the oak on the N. and NW. aspect of Valdai, and of the walnut and chestnut on the Hartz, adopts the same view; "the true explanation of this phenomenon is, that the vegetation under a northern aspect is so much retarded as to be secured from the danger of night-frosts in spring." This is probable; but other causes are apparently at work, amongst the chief of which are the hot rays

* That Baron Hügel means aspect is confirmed by Mr. Vigne, account of Kashmeer, J. A. S., September 1837, p. 771. "Those places on which the rays of the morning sun first break are well covered with *jangal;* the whole of the south side of the valley, for instance; while the north side, which from the height of the mountain range is kept a long time in shadow, is comparatively destitute of trees, but plentifully covered with grass." The fact is much more certain than the reason.

of the sun, and violent winds, of which the first seem especially inimical to the growth of the *Coniferæ*. Bingley notices that, even on the Scottish mountains, *P. sylvestris* flourishes best on the N. and NE. sides. It is chiefly the arborescent vegetation, moreover, which is suppressed on the southern face of the Himalaya; many grasses and herbaceous plants prefer it; and where the general surface of a mountain is destitute of forest, we may perceive the trees stealing a considerable way up the ravines, where they are sheltered from sun and wind. On our own SW. coasts, trees cannot be reared unless protected from the frequent SW. gales by a wall or fence; and no sooner is this overtopped, than their heads are cut back obliquely, as smoothly and regularly as if clipped with shears.

Dr. Griffith repeatedly observed the nakedness of southern and the woodiness of northern aspects in Bhotan and Afghanistan. He says (*Journals of Travels*, p. 292,)—"This is contrary to what usually happens; the south face of mountains being supposed to be better wooded than the others; but in Bhotan, the difference would seem to be due to the piercing winds blowing from south or up the ravine of the Teemboo," and again; "the most marked peculiarity is the comparative absence of *Abies densa (Webbiana)* on the east side of the mountain, and its excessive abundance on the west," an observation equally true of the whole British Himalaya. However, in Afghanistan he found the phenomena to be exactly similar; "the opposite side of the Tezeen valley is seen, and the summit of the Sufed Koh: here, wonderful to relate, are abundance of firs, extending down and along the ridge to some distance, but not forming forests." From Soorkhab, looking south, "a fine view of Sufed Koh is obtained, the lower ranges in some places being black with firs," pp. 411, 414, which from 457, 464, &c. appear to consist of *P. longifolia* and *Gerardiana*, with *Cedrus Deodara*. Finally, at Pushut, "the mountains to the south are well wooded, the woods occurring here and there in forests, p. 436. Sir Alexander Burnes and other travellers have remarked the aridity of the Himalayan ranges as seen from Kabul, &c.; but had they been viewed from the north instead of the south, the impression would perhaps have been much modified. Colonel Jack, (*Darjeeling Guide* for 1845, p.

170,) concludes that—"forest grows more profusely on northern aspects, owing to the fact that the moisture on northern aspects is protected from evaporation in a greater degree than on the southern." We may recollect also, that the axis of the Himalaya having a NW. and SE. direction, the great spurs are thrown off to SW. with their eastern faces fronting SE., and therefore more exposed to the sun's rays than the opposite ones. Long, too, before the sun has attained the meridian, so as to shine on the latter, the diurnal breeze sets in, and prevents their surfaces from becoming equally heated with the SE. exposures. Dr. Hooker also remarks to me, that the SE. is a very strong and drying wind; and writes of the Sikhim Himalaya,—"the western faces I found much more snowed than the eastern at 15,000 feet, because the sun shines brightest in the morning, and is invariably clouded by noon." Lieutenant Strachey, in taking points of Trisool and other Alps of Gurhwal and Kumaoon, to determine the position of the snow-line, found the same fact hold true; and Schouw (*Physical Sketch of Europe*) observes of the Scandinavian chain, "on the western side the snow-line is lower than on the eastern, because the snow is not so easily melted in foggy damp summers, as it is under a clear sky." The general result is, then, that the pine tribes flourish on the west and north rather than on the east and south sides of mountains, because they enjoy there a cooler, a calmer, and more humid soil and atmosphere; for the mechanical action of the winds seems also necessary to be taken into consideration. Vegetables, denied the faculty of locomotion, take the requisite exercise by being swayed to and fro by occasional winds; but the gales which blow so regularly and fiercely up the Himalayan glens, as remarked by Dr. Griffith, must destroy the loftier and more exposed individuals, or prevent their existence, very much as one of the higher animals would be killed by a state of perpetual action, the necessary intervals of repose being withheld.

"*Manderung*" is quoted p. 51, as one of the "many kinds of pine" observed by Captain A. Gerard, (*Journal*, September 18, 1817,) and other travellers in the NW. Himalaya: in this instance he trusted to memory or hearsay, and they copied his oversight. *Manderung* being in fact a maple, I think *Acer sterculiaceum;* and his

"*Sungcha* pine" no other than the yew, as I ascertained on the spot in 1845. "*Bhurglei*" (in Gurhwal "*Bunglai*"), to which he gives 13,000 feet as the upper limit, is *Salix leucomelas.*

P. 53, Note. The testimony of Pliny corroborates that of Cæsar as to the power of larch-wood to resist fire. He says (*Hist. Nat.* LXVI.) "larice, quæ nec ardet nec carbonem facit, nec alio modo ignis vi consumitur, quam lapides." Vitruvius states, that Julius Cæsar endeavoured in vain to burn down Parignum, a tower in the Alps, by heaping against it logs of larch; they would not ignite: and Loudon says, "The wood of the larch ignites with difficulty, and a fire made of it will, if not attended to, extinguish itself before the wood is half consumed." Nevertheless, Erman represents it, if I remember right, as in frequent use in Siberia, where it is in great perfection and abundance, more hardy than the birch and willow; its upper limit being 4,040 feet on the Aldan mountains, near Okhotsk. The Russian name is *Listvennetsa,* "a crown of leaves." An attempt to introduce the tree to Kumaoon failed from the seeds being soldered up in tin, and probably sent round the Cape from England.

The discovery by Dr. Griffith of a genuine larch in Bhotan, (p. 53,) renders Dr. Royle's "of true larix none" no longer applicable to the Himalaya. My original reference was derived from Dr. Griffith's report to Government in the Journal of the Asiatic Society: in the *Journals of Travels,* (p. 287, 293,) its occurrence is twice mentioned, once at 6,000, and once, above Woollookka, at 9,400 feet; dwarfed at the latter elevation. From the *Itinerary Notes,* p. 189, No. 1,011, the latter only would appear to be the authentic habitat: at least it is not inserted elsewhere. Supposing the species to be the same, I am indebted to Dr. Hooker for the following account of its appearance and habitat west of Bhotan.

"The larch, which I propose should bear Griffith's name, occurs in Sikhim and in the valleys of eastern Nepal, close up to the snow. In the latter country, the Kambachen valley, immediately under the Junmu Peak of 25,000 feet, is full of it at 11,000 to 12,000 feet, mixed with *Abies Webbiana.* In Sikhim, it is very common in the interior and rearward valleys and mountain slopes; but is not found in the Sub-Himalaya, or on the south flanks of Kunchinjinga. Limits 9,000 to 13,000 feet; usually 9,000 to 12,000. Rarely

occurs gregarious or in clumps: habit and habitat a good deal resembling those of *Larix Europœa;* but the leaves, which redden and fall in November, are in more scattered fascicles. Cones large, erect, red-purple when young, and abounding in tears of white resin. It rarely exceeds 30 to 40 feet in height, except on shingle banks of alpine streams, where it sometimes attains 60. It is an inelegant, sparely-branched tree, and, except for its bright-green foliage and resinous cones, unworthy of comparison with the European species. The boughs stand out awkwardly, and often droop suddenly in very pendulous and even flagelliform branches. Timber small, but splits well, and is used for flooring. The Bhotiya name is *Sah.*"

Abies Brunoniana (Pinus dumosa, Don). This was omitted in the enumeration of NW. Himalayan pines, as I had never seen it; but it probably exists at its NW. limit, in the Bhotiya purgunnas of Kumaoon, towards the sources of the Kalee, which seem to be indicated by the "*Bhotaniæ alpibus*" of Don, who states that it was there found by Captain Webb: it is perhaps to be included in the pines noted there by Captain H. Strachey, under the name "*Woomun.*" Dr. Wallich mentions the Nepalese (Newar?) name "*Changathasi Dhoop,*" implying that it is employed for incense; but Don has "*Silloo Hatarhee.*" Gosainthan, Bunipa, and Sheopoor are given as habitats; but, when in Nepal, Mr. Winterbottom learned from plant collectors, that the tree does not grow on the latter mountain. Dr. Hooker has recently found it in Sikhim, forming a narrow belt of 1,000 feet, confined to very narrow gorges between 9,000 and 10,000 feet, on the immediate (south) flanks of Kunchinjinga, probably the loftiest peak in the world, being above 28,000 feet. In the innermost valleys, the limits are 8,500 and 10,500. The Gorkhalee name is "*Thingia*" or "*Tingoori-sulla;*" the Bhotiya "*Semadoong.*" Dr. Hooker considers it to be by far the most beautiful of Sikhim pines, whether as an individual tree, in groups, or in forest masses. One specimen was 27 feet in girth at the height of 5 feet. Timber inferior to that of *Picea Webbiana,* (being liable to warp, Webb:) bark much used for sheds and hovels; also to roof stacks of *P. Webbiana* planks. By Dr. Griffith it is frequently mentioned in Bhotan proper, occurring from 6,500 to 9,700 feet above the sea, "a large solitary tree, with

pendulous branches," but the doubt "probably a *Podocarpus*," "*Taxus* or *Abies Brunonis*" (*Journals*, pp. 234, 220, 242, 243, 245, 246, 261, 267,) must leave it uncertain till his specimens be compared, whether he intended this tree.

Abies Brunoniana is stated to be a tall (70—80 feet) spreading tree, branching at 15 to 20 feet, with pendulous and very brittle boughs; and nearly allied to *A. Canadensis*, the Hemlock spruce. Leaves solitary, two-ranked, an inch long, linear, obtuse, minutely toothed towards the apex, with reflexed margin; covered below with milk-white mealiness, and so deciduous that the slight shake of the branch is sufficient to detach them; a circumstance true of drying specimens, which Dr. Wallich remarks, will not retain their leaves for a single day, but incredible of living ones, when we remember the stormy region of which the tree is a native. The cones are terminal, solitary sessile ovate; scales persistent; rounded, with eroded margin. The cones are only about an inch long, and form a striking contrast with those of *P. longifolia*, one of which, from the Thakil mountain, is about 7 inches long, and twice as many round, near the base.

V. Picea Pindrow.—Dr. Griffith describes *Abies densa*, abundant on all the northern mountains of Bhotan, in terms which lead us to conclude this, and especially *P. Webbiana*, to be the species intended: he calls it "the black pine," alludes to its "columnar" form, and says it is "the marked indicator of great elevations;" fixing its lower limit at 8,800 feet, the upper at 12,478, and even 13,000 feet. He notes "many pines dead as if blasted;" "as usual many blasted from lightning:"* characters and limits well suited to include both; the *Pindrow* generally commencing at about 8,000 feet, and *P. Webbiana*, exclusively, attaining 12,000 or

* Journals, 246, 260, 264, 265, 276. During a recent visit to the alpine regions of SE. Gurhwal, I was assured by intelligent persons that these forests of dead pines are the result not of lightning but of the fires which rage in the hot dry months, May and June.

I found the people distinguish *P. Pindrow* as "*Telia*" or "*Chilee*" *Ragha*, from *P. Webbiana*, "*Bung*" or "*Dodhma*" *Ragha*.

Since the text was written, I have seen Dr. Griffith's figure (56) of *Abies densa*: it is that of *Picea Webbiana*.

13,000. It is possible, however, that the *Pindrow* may be absent from Bhotan; Dr. Hooker has not detected it in Sikhim; (perhaps because that country is almost wholly devoid of *Coniferæ* in the zone 8,000—10,000, proper to the *Pindrow*:) and he leads me to suppose that Dr. Thomson does not recognize them as really distinct species.* There can, however, be no doubt that in habitat and several marked peculiarities, there are constant differences; and between what we term a species and a variety thus characterized, the distinction seems sufficiently wide to entitle the latter to be so classed also. They are indeed very generally confounded by the natives of the NW. Himalaya; the mountaineers of Rol, a district south of the Shatool Pass, insisting that the short white leaves of the silver fir are due solely to the cold and boisterous nature of the climate in which it flourishes. This persuasion of *the force of circumstances* in the transmutation of species is by no means uncommon in the Himalaya: and, though some of the examples are extravagant enough, it is possible that, in this case, the naturalists of Rol may be right, without having enjoyed the advantage of studying the theories of Lamarck or the Vestiges of the Natural History of Creation. I shall consider it as distinct.

Picea Pindrow forms dense forests on all the great spurs of the Kumaoon Alps, towards the heads of the Pindur, Surjoo, Ramgunga, and Kalee rivers, where (as in Gurhwal) the Khusiya name is "*Ragha*;" the Bhotiyas of Byans call it "*Woomun*." In central Kumaoon it is confined, so far as I have observed, to the great mass of Bhutkot and Boora Pinnath, from about 7,500 to 9,000 feet, where it clothes the sources of the Kosilla in a forest of unusual gloom and thickness. The name here (and on Doodootolee) is "*Raisulla*." This level of 7,500 feet is one at which the tree will never be found on a detached mountain of that elevation, or even a thousand feet higher; Cheenur, for instance, at Nynee Tal; but, under proper conditions, it will descend from greater heights to establish itself in this zone. The direct distance of Bhutkot from the plains of Rohilkhund is 35 miles, about 5 less than that of Muhasoo

* According to Dr. Thomson, the specimens of *Gobria-sulla* collected by Dr. Hooker in Sikhim, represent far wider differences both of cones and leaves than do the *Picea Pindrow* and *Webbiana* of the NW.

from those of Sirhind; but on Soorkhunda Devee, near Dhunoultee forest, two stages east of Mussooree, the *Pindrow* appears on the outermost range of the Himalaya, where it attains the elevation of Bhutkot, 9,200 feet. Dr. Hoffmeister fixes its limits at 8,000 and 9,500 feet, and (p. 495, 496,) states that in Gurhwal and Kumaoon, travelling NW. from Nynee Tal, *Picea Pindrow* and *Webbiana* first occur on the spurs of Toongnath mountain. But this statement is completely erroneous, and could only arise from the most hurried and superficial survey of the intermediate country. The *Pindrow*, as just mentioned, abounds on Bhutkot, a few miles east of Dwarahat, one of his stages; while near Sunianee, the site of Lohba villa, (p. 494,) it is in equal or greater abundance 3 or 4 miles east on the Byansee, Kankur, Kala-jabur, and Kala-bun mountains and forests; the last being so named (black forest) from it. A few miles west of Sunianee is Doodootolee mountain, the Gundiyal Gebirge of Ritter's map, under which designation (that of a village merely,) it is here named by Dr. Hoffmeister. Vast forests of *Pindrow* cover its northern and western slopes and spurs: and the last 500 or 600 feet are covered with *Picea Webbiana*, amongst which, on one side, are the sources of the (western) Ramgunga; and on the other those of the Nyar, the last considerable affluent of the Ganges before it quits the mountains. Doodootolee is a grand outburst of granite, unnoticed in any of our geological maps; the summit is nearly 10,300 feet; and here I first remarked that the tree *Rhododendron*, which in Kumaoon also flourishes to 11,000 feet, is not the common scarlet one, but has rosy flowers, and is, therefore, probably Don's *R. arboreum*, floribus roseis, a variety and elevation unknown, I think, in Busehur.* Captain A. Gerard assigns 8,340 feet as the inferior limit of the *Pindrow* on the southern face of Muhasoo; on the northern side, as well as near Illanee on

* It is needless to say that this diminution of color is attributed by the people very confidently to the increased *cold:* yet there is a difficulty in adopting this view, even with so small an amount of difference in *form* as is here apparent. During the present unseasonably dry month of July 1849, the common scarlet *Rhododendron* is everywhere in blossom; and the effect of the *heat* is not only considerably to diminish the size, but also the intensity of color in the *flowers*, which is reduced nearly to that of the Doodooto-

the Bireh Gunga, in Gurhwal, it certainly descends nearly a thousand feet lower, delighting, like the spruce, in damp cold glens, where we search in vain for the cedar, the cypress, and the pine. In such situations, it constitutes the main feature of vegetation on the Choor, the Changsheel, Shallee, and the snowy range of Busehur, forming almost invariably, the belt next below *Abies Webbiana.* In the absence of more civilized mattrasses the "spray" of each affords no mean bedding, and is in frequent requisition for this purpose: like *Picea balsamea,* in Canada, where "the Indians, in their winter journies, scrape the snow together with their shoes, thus making a kind of wall to their lair, and then strewing the ground with branches of this fir, wrap themselves in their blankets. Defended in this manner, they sleep in security when the thermometer is many degrees below zero; and in this way did Captain Thompson sleep between two Indians in his unsuccessful attempt to overtake Captain Franklin in his Arctic journey."

The *Pindrow* appears not to have been hitherto traced beyond Kashmeer, where Mr. Winterbottom and other botanists found it plentifully on the Peer Punjal, and all the southern and eastern ranges, still exhibiting its preference for northern and western aspects. It probably exists with *Abies Smithiana,* in the mountains of Kafiristan.

Dr. Griffith has somewhere expressed his resolution, in the event of any new pine being discovered in our mountains, to consecrate it to the memory of Captain Herbert; and should no such discovery be made, to apply his name to the very best of those already known. The Nepalese larch, being intended to commemorate himself, the local and barbarous term *Pindrow,* applied to this tree, meets the want almost equally well; and it would be no more than a merited compliment to both these gentlemen were it to be distinguished henceforth as *Picea Herbertiana.*

The names of the conquerors and explorers of the Himalaya, Ochterlony, Lawtie, Hodgson, Herbert, Griffith, Hooker, Falconer,

lee variety. Are we to reconcile the phenomena by the fact that the sun's rays on Doodootolee at 10,000 feet are really more intense than on Binsur at 7,000, and that it is their heat, and not the cold of the atmosphere, which blanches the flowers of the rosy variety?

Strachey, might thus be associated with the scenes and the objects, which their zeal, science, or military skill have opened to our residence and knowledge: and that in a more pleasing and even permanent manner than by the creation of monuments in Bengal, a country which has so little in common with the Himalaya, except the Ganges.

> "While kings, in dusky darkness hid,
> Have left a nameless pyramid;
> Thy heroes, though the general doom
> Have swept the column from their tomb,
> A mightier monument command,
> The mountains of their native land."

The term *Pindrow* is chiefly used in the petty state of Komharsen (Nagkunda); in Kotgooroo and Bhujee, the name is *Boorool, Boorra* and *Booldoo:* in the Tiroch (Ootroj) mountains, the *Urukta* of Royle, I found it named *Morinda,* which Dr. Hoffmeister states to be the usual designation in Gurhwal, though "*Koolloo*" appears to be occasionally used, when *Morinda* is transferred to *Abies Smithiana.* It is the *Chilrow* of Joobul and the Choor, where however, the people often confound it with the yew. In Koonawur it is known as the *Khurok* or *Khurog;* and along the whole length of the Busehur snowy range, (south side) *Picea Pindrow* and *Webbiana* are equally termed "*Kul-rai,*" quasi *Kala-rai,* "the black fir."

The *Pindrow* flowers in April and May, at which seasons the tender shoots, as in the yew, have leaves of the brightest green, those of the past year being almost black. The trunk is branched nearly to the ground, but cones are only produced on the loftiest boughs, and (it seemed) more numerously on young than on old trees. From the fresh bud-scales at their base, I conclude that they are formed and matured in one season, and in about the same period as those of the spruce. By the middle of May the cones are about three inches long by one in diameter, and more or less cylindrical: as the season advances, they become completely so, and from the concealment of the bracteoles, very smooth; of the same rich and beautiful dark purple color as those of *P. Webbiana;* they ripen in October and November. The distinction of *P. Pindrow* from *P. Webbiana* by its oval, not cylindrical, cones, is untenable; and

the result of a careful examination strongly favors the supposition, that either the fruits are interchangeable or that Professor Don (in Royle's Illustrations) has exactly reversed the descriptions; the cones of the *Pindrow* being perfectly cylindrical: those of *Webbiana* nearly cylindrical, thicker, and shorter. Scales of *Pindrow* more prominently eared; bracteoles oval, obtuse, eroded, emarginate, the mucro of the same length as the border of the sinus: in *Webbiana* the bracteole is more rounded, scarcely emarginate, with thicker and longer mucro or apex.

The spiral arrangement of the scales seems identical, and each has the same copious supply of white resin. This substance perhaps indicates the origin of the name *Pindrow* (as *P. balsamea* in Canada), *pind* in Sanscrit signifying "incense," "myrrh," "frankincense;" as well as a "date tree," to which the etymology was referred, p. 57. "*Morunda,*" without root or application in Wilson's Dictionary, is defined "the nectar or honey of a flower," and may originally have designated this resinous substance of the cones.

On several of the lofty Passes between Toongnath and Gungotree, Dr. Hoffmeister records instances of *Pindrow,* which he estimated from 30 to 40 feet in circumference, and about 200 in height.* It does not seem to attain this magnitude in the NW. mountains, as will appear from the following measurements at five feet from the ground:

No. 1	17	feet	Choor mountain.
,, 2	15	,,	
,, 3	13	,,	
,, 4	12	,,	
,, 5	$16\frac{1}{3}$	,,	Kumuloree mountain, above Nagkunda.
,, 6	$14\frac{5}{6}$	,,	
,, 7	$13\frac{5}{6}$	,,	
,, 8	$13\frac{2}{3}$	,,	Nagkunda.
,, 9	$11\frac{1}{3}$	,,	
,, 10	$17\frac{1}{2}$	,,	Near Kalapanee, Changsheel Range.

* I take the girth from the letter to M. Humboldt, p. 498, but there is apparently an oversight: by a reference to other pages (325, 503, 508), we find the diameter of this tree stated to be 6 feet, and the circumference 20, little exceeding those of the text; perhaps not at all, as the height of the measurement is not stated:—or two trees may be referred to, for in a MS. of Dr. H.'s in my possession, a tree above Reithal is entered 32 feet in girth, and above 200 high.

VI. Picea Webbiana.—Under the temporary name of *Abies densa,* Dr. Griffith informs us, that this species, rare below 9,500 feet, constitutes vast woods at 12,000 feet, below the belt of *Rhododendrons* in Bhotan, as on the Rodoola Pass: adding—"It has a tabular form, and very sombre appearance, and can be recognized even at great distances by its black columnar PALM-LIKE appearance," (*Journals,* pp. 258, 259, 265 *with Itinerary Notes,* p. 141, No. 662). We next meet it in Sikhim, where Dr. Hooker has recently found it occupying the zone from 9,700 to 11,500 feet on the flanks of Kunchinjinga, and has kindly furnished me with the following memorandum: "Gorkhalee name '*Gobria-sulla,*' Bhotiya, '*Doongshing.*' The most abundant pine of Sikhim. Limits on the south flanks of Kunchinjinga and crests of Inner Sub-Himalaya, 10,000 to 12,000 feet: but in the inner vallies and rearward ranges, 9,000 to 13,000. Wood much used for Bhotiya houses: sprigs offered in temples; and the cones on *chayts.* Resin white, exuding only on S. and SE. side of trunk. A beautiful dye of a lovely violet color is extracted fron the young cones. A large fuscous *Agaricus* grows about the roots—"*Oonglau*" of the Bhotiyas, who eat it abundantly."

Of this portion of the Himalaya, Dr. Hooker writes to me, "between the upper limit of *Pinus longifolia* (2,000 feet) and the lower limit of *Abies Webbiana* (9,700), Sikhim has no pine whatever, not even a straggler; with very few and rare exceptions, a dense humid forest extends up to that level." *P. longifolia,* moreover, occurs only in ONE place: the statement alone of which facts is sufficient to prove the wonderful difference which must exist between the climate of Sikhim and that of Busehur: analogous in fact to that between Bengal and Sirhind. From Don's Prodromus we learn that it is found on Gosainthan, in Nepal, being there, as in Kumaoon, confined to the Himalaya and its immediate branches; none of the sub-Himalayan mountains being here sufficiently elevated for its growth. It seems to have been first discovered by Captain Webb, in SE. Gurhwal, near Ramnee, on one of the spurs of the colossal Trisool, between the Pindur and the Uluknunda rivers; a tract which for the first time has just (June 1849) been explored by Lieut. Richard Strachey, (and in September was visited by myself,) who writes to

me, that this fir is common on these and on the Pilgwenta ridge, behind Josheemuth, the *Pindrow* being invariably some thousand feet below. East of this, towards the sources of the Pindur, Surjoo, Ramgunga, and other rivers in Kumaoon, it is the last fir that occurs, in approaching the glaciers in which they rise. In central Gurhwal, we first meet it on the summit of Doodootolee, at a distance of 45 miles from the plains, and still further NW. on the Tyn or Manma Teeba, 30 miles from the plains: in this locality, Moonshee Murdan Alee assures me, that the very remarkable anomaly is exhibited of the *Pindrow* being entirely absent. Occurring so near as Soorkhunda Devee, and so generally in subordination to *Picea Webbiana*, the fact is almost incredible, and yet it receives countenance from Dr. Royle's silence in his list of habitats. (Dr. Falconer fully bears out the Moonshee, February 1850.) Dr. Hoffmeister (p. 497,) found *Picea Webbiana* "shooting up to 150 feet" (and 24 in girth, MS.) along the great spurs SE. of Reithal, on the Bhagiruthee Ganges; though in the synopsis, p. 503, 80 feet only are assigned as the height, and by a manifest oversight, 6,500, as the inferior limit; his papers were drawn up in haste, and amidst many interruptions; and from p. 497 it appears likely this last number was intended for *Abies Smithiana.* I was myself in error in doubting the existence of *Picea Webbiana* on the Choor mountain, the boundary between Joobul and Sirmour; it is in abundance on the NE. side for the last 1,500 or 2,000 feet, commencing nearly where the *Pindrow* ceases, about the middle zone of *Quercus semecarpifolia* (where snow remains till the middle of May), and accompanying that oak with *Betula bhojpatra* and *Rhododendron campanulatum*, nearly to the summit, 12,150 feet, when, however, it is beaten down and starved to a mere straggling bush. The distance from the plains of Sirhind is 27 to 30 miles. Dr. Royle quotes this mountain amongst other as the location of *Picea Pindrow* at 10,000 to 12,000 feet, but I do not think it ever much exceeds the former limit, and the fact that there are no pines in Sikhim below this level, will account for Dr. Hooker having missed the *Pindrow* there.

Dr. Hoffmeister (p. 501,) mentions *P. Webbiana* at Nagkunda and above Kot-gurh, but I have examined that neighbourhood minutely, and never observed it there, nor even on Huttoo,

which rises 1,500 feet higher, and where *Betula bhojpatra* and *Rhododendron lepidotum* occur sparingly; nevertheless, as on the main ranges trees certainly ascend higher and descend lower than on such detached summits as the Choor, it is probable 10,000 feet is (a few hundred feet more or less) the lower limit of *Abies Webbiana*, on the south face of the Himalaya: and that whenever we read of *A. densa*, in Dr. Griffith's Bhotan journey, below this, we may understand the *Pindrow* to be intended. If the former, and not the spruce fir, be, as I suppose, Gerard's "*Khutrow*" or "*Rooee* pine," he fixes its highest limit in lat. 31° 20′, at 11,780 feet on the south face of the Himalaya, and at 12,591 on the north; a near approximation to the 13,000 feet assigned by Dr. Griffith for Bhotan. On Doodootolee mountain, the *Pindrow* gives place to *Picea Webbiana* at about 9,700 feet: the same on Toongnath, where the latter ceases with all forest at about 11,200 feet: the temple itself being 11,493 feet, and the Chundur Sikhur Peak, immediately above, 12,134; as lately determined by Mr. John Strachey: the map, on some insufficient observation, omitted altogether by Captain Webb in his pamphlet of revised heights, gives the temple 9,989 only. Near Kolara, on the north face of Pilgwenta (*i. e.* Pilcoonta hill, map), *Picea Webbiana* ceases at 11,500 or 12,000 feet: nor does the *Pindrow* shew itself till we descend at least a thousand feet. "Not one specimen of the fir tribe is to be seen on the way to Kedarnath," says Dr. Hoffmeister, p. 496. This is but partially true, for the *Pindrow* occurs on the road side below Bheemoodiyar; while *P. Webbiana*, though rare, reaches the limit of forest. The deficiency is to be accounted for by the eastern exposure of the route from Goureekoond upward: across the river (Kalee Gunga) both species are in abundance in their proper zones.

If sought in its proper zone, *P. Webbiana* is by no means "one of the rarer species." On the northern side of the Shatool Pass it forms most dense and extensive forests below the birch, at Ating Wodar; and is even still more magnificent, lower down between the Ootulmai Ghatee and Panwee village. On the southern face of Shatool, above Rol, it does not flourish; but on the SW. approach to the Roopin Pass, from Rasrung (or Surra), nearly down to Jaka, and all over the upper Changsheel, the silver fir is abundant and

luxuriant, associated with *Pyrus foliolosa, Cerasus cornuta, Rosa Webbiana, Quercus semecarpifolia, Betula bhojpatra, Rhododendron campanulatum* (and in Kumaoon and SE. Gurhwal, *R. arboreum* also), *Syringa emodi;* in these last named districts also, it may often be seen graced with the splendid festoons of a very large and handsome *Clematis*, near *C. montana.*

Notwithstanding the whiteness of the under-face of its leaves, the general effect of the Himalayan silver fir is exceedingly dark and gloomy; more intense, indeed, than that of the cypress, which, from any distance, it a good deal resembles. The form has pretty nearly the tall columnar outline of the *Pindrow*, with boughs somewhat less bushy and pendulous; and, on the whole, the long-leaved, thorough-going black *Pindrow* must be pronounced the handsomer tree.

Picea Webbiana has not hitherto, that I am aware of, been identified beyond the Sutluj: but there is no reason to doubt its presence in Kashmeer and Kafiristan. The largest specimen measured on the Choor was 11 feet 8 inches round; at Kolara is one of 16 feet, both at the height of 5 feet, but on the mountains of NW. Gurhwal, Dr. Hoffmeister estimated several at 24 feet girth. In Sikhim at the same height Dr. Hooker measured one of 30 feet girth. Captain Webb alludes to "the silvery hue of the bark," but commonly it is rough and brown, as in the older samples of *Picea pectinata*, the European silver fir, where, after 50 or 60 years, the smooth, greyish-white layers peel off, and fall in large scales.

The young shoots of *P. Webbiana* appear in May, in which month the tree flowers: the strobili are then of a purplish-red, and when mature, probably assume the rich orange tint of *P. pectinata.* The leaves are from three-quarters of an inch to two inches long, with the double white band beneath, as in the European species: the apex is rather more obtusely bidentate than in the *Pindrow*, but a close examination is necessary to perceive this character, which escaped Captain Webb, who described the leaves as sharp-pointed: and indeed the amount of difference, though apparently constant, is sufficiently minute to justify the expression. As in the *Pindrow*, the leaves originate all round the branch, but dispose themselves laterally in two rows, except in the dwarf bushes at extreme elevations, when those of the upper half become horrent. On compa-

rison with the description of the "Indian silver fir" of the *Penny Cyclopædia,* referred to in p. 47, they fail in the test "slender, four-cornered;" and if the cone of the tree there intended be really erect, it is clear the leaves of *Abies Smithiana* have, by some mistake, crept into the description (written before a reference to the *Arboretum Britannicum,* shewed the error to lie in the erect position assigned to the cones of the last).

As to the value of the silver fir as timber, Captain Webb states, that "the wood even equals in the texture of its grain and in odor the Bermuda cedar," but this requires qualification: Mr. Batten calls it "white and not very good." By the kindness of Captain W. Jones, Engineers, I am enabled to annex the results of experiments carried on by him at Almorah on the strength of pine timber, amongst which is the *Raisulla,* considered to represent *P. Webbiana:* the fragments fully bear out Mr. Batten's opinion, being white, very soft, rather coarse-grained, and without any odor of Bermuda cedar: the specimens, however, may be *Pindrow,* (known as *Raisulla* on Bhutkot, the nearest site to Almorah,) but this is too closely allied to the silver fir to allow the supposition of much difference in the nature of the timber: and though it were otherwise, the localities of *P. Webbiana* are too remote and difficult of access to admit its being brought to market, or even much used by the NW. Himalayan mountaineers.

The vernacular terms to express *Picea Webbiana* are, for the most part, identical with those of the *Pindrow.* It is the *Ragha* and *Rao Ragha* of Kumaoon and SE. Gurhwal; *Chilrow* of central Gurhwal and Tiroch; *Morunda* of NW. Gurhwal and the Roopin valley, in Busehur; *Kulrai* of Rol; and "*Spun*" of Koonawur, under which name it is frequently mentioned in Captain A. Gerard's Journals. On the Choor, my guides called it *Kilounta,* which appears to be merely a Sanscrit compound ("end of the pine,") to signify the fir-cone, which is properly "*ronk*" in the Joobul dialect. The observations of Captain A. Gerard, made under favorable circumstances and with excellent instruments, are of much interest generally, but in some cases lose much of their value from the want of precision in the nomenclature, which unfortunately is always the vernacular. Thus in the account of Koonawur, p. 67, he gives the

upper limits of the *Khutrow,* 12,000 feet: as the *Rai* or *Ryung (Abies Smithiana)* is distinguished in the list there given, I conclude that *Picea Pindrow,* or rather from the great elevation, *P. Webbiana* is intended. On the north face of the Busehur snowy range he notes (Appendix) the "*Khutrow* or *Rooee*" pine at 12,591 feet, and 11,780 in another locality. He further mentions the "*Pindrow* or *Row*:" but, on Huttoo, correctly separates "*Ro*" *(Abies Smithiana)* from "*Pindrow.*" His "*Ro'oo*" of Muhasoo, "covered with large creepers" *(Hedera* and *Ampelopsis),* is certainly *Abies Smithiana,* which, on Choor, and indeed commonly, is so called. Nevertheless, from some acquaintance with the localities, I am persuaded that his *Khutrow* or *Rooee* at 12,591 feet is *Picea Webbiana.* At p. 5 he tells us, that in some situations, the pines of the outer Himalaya approach 13,000 feet elevation: "The pines and oaks grow at all elevations, from the bed of the Sutluj, 5,000, to the height of 12,000 feet, after which they become stunted and in the form of bushes, are rarely met with at 13,000 feet." Dr. Griffith, as already cited, found it the same in Bhotan. On the Yoosoo Pass, near the source of the Soopun, Captain Gerard (Lloyd and Gerard, I. 25 II. 19) finds that though some pines and oaks reach 11,950 feet, the general limit of forest is 11,800, where "the trees grow stunted and in the form of bushes," a fact much more generally true than Dr. Gerard's, who (I. 243,) states that the pines commonly "disappear suddenly while in full perfection," but the Dr. was accustomed to write, with what M. Humboldt mildly terms, "abandon."

Captain A. Gerard became very early aware that trees are most abundant on the NW. aspects; and he also observes, that "they in general rise several hundred feet higher there than on the opposite face; in some cases, the difference exceeds 1,000 feet, (II. 35, 39,) the altitude on the NW. side 12,850 feet, being the same as on the north. In the valley of the Buspa, the upper limit of pines is 12,000 feet, (II. 39, 42.)

VII. CEDRUS DEODARA.*—Well informed brahmans of Kumaoon assure me, that no other tree has ever been considered the *Deodaroo*

* It appears from the Gleanings in Science for February 1830, p. 68, that it was introduced into Great Britain by Dr. Govan in 1818, 4 or 5 years anterior to the period I have stated, p. 62.

of the Shastras, and the universal practice of the inhabitants of the province (where the tree seems to be not indigenous) quite corroborates the grammarians, for we find groves of it, carefully protected, about every temple of sanctity: and nowhere else. It has no provincial appellation, except *Diyar* and *Deewar*, to which Khusiyas and Gorkhalees sometimes abbreviate the orthodox Sanscrit. The "*Kelon*" of Busehur and NW. Gurhwal (occasionally varied to *Keool, Kelee, Keltoo*, &c.) and still nearer, "*Kelmung*" of the Arian population of Koonawur, is manifestly the Sanscrit "*Kilimuh*," "*Kilimu*," rendered *Pinus deodara* by Dr. Wilson; and "*Kilimum*," its resin or extract (*Kelon-ka-tel*), from *Kil*, to throw or cast (out resin), also *to be white*, alluding to its color. In Arabic, *Kitran*, tar, (*Kitt* of the artillery laboratory) from *Kutur*, he distilled, and *Kedria* (Greek or Syriac), the product, point to a similar etymology of *Cedrus*. The Umurkosh gives *Kilimuh* as a synonyme of *Deodaroo*, with others, which put the identity beyond question; such are "*Snehuvriksh*" and "*Snehuviddh*," from *Snehu*, oil, *Vriksh*, tree, and *Viddh*, pierced, impregnated.*

It seems clear, too, that the Brahmans of Gungotree (whose testimony was desired, p. 78, to decide this *questio vexata*) have no notion that the usual application of "*Deodara*" is a blunder, and that the term really belongs to the cypress or juniper. For Fraser (Asiatic Res. XIII. 233,) tells us that between Duralee and Gungotree "several trees of cedar were pointed out to us by the Brahmans; but they were not abundant; it appeared the common red cedar, and is called by the natives *Dhoop* (incense): they regard it as very

It is worthy of enquiry, whether the luxuriance of the vegetation on the western coast of India and its comparative poverty on the Coromandel side, is connected with the same phenomena on the western and eastern faces of the Himalayan ranges, where the abundance of species is by no means restricted to the *Coniferæ*.

* Another Sanscrit synonyme is "*Snigdhuh*," signifying oily, unctuous, from *Snih*. Have we not here the sources of the term "*Schnee*" applied to a tree which occurs in Afghanistan, on the Kojuk Pass, called *Xanthoxylon* or *Balsamodendron* by Dr. Griffith, (*Journal of Travels, p.* 344. *Journal of As. Soc. Bengal, No.* 120 *for* 1841,) and *Pistacio terebinthus* by Dr. Robertson, (*Calcutta Journal of Natural History, October* 1841) "Exuding viscid gum, with strong terebinthine odor."

sacred." Being associated with the gooseberry, the elevation must be great, more adapted to *Juniperus excelsa* than to *Cupressus torulosa*: but in either case, "*Deodar*" is there exclusively understood of the "*Kelon.*" The local and partial application to the cypress by the people about Simla, of the word *Deodar*, may have arisen from that of "*Kelon*" to the cedar, and their ignorance that the terms are synonymous.

With respect to the derivation of "*Cedrus*," it appears from Rosenmüller, Loudon, and others, that the Romans knew the *Mauritanian Arar* or *Thuja* by the name "*Citrus*," which is probably the same term, and the Greek Κεδρον: thus intimating that the name was not restricted to the cedar of Lebanon, which, however, was also a native of Africa, and is reported to have been recently found on Mount Atlas. Pliny says—"*Cedrus* in Creta, Africa, Syria, *laudatissima.*" Κεδρον would come to the Greeks from Syria, *Citrus* to the Romans from Carthage, a Syrian colony: indicating the etymology given in the text, from *Kudr*, worth, value, or *Kutur*, distillation; our *Citron* and the French *Cedrat* being derivatives. Nevertheless, Pliny describes the process of making "*Cedria*" in terms which vindicate my friend's etymology (p. 112) from *keo*, to burn, *drio*, to sweat or distil: his words are (*Hist. Nat.* XVI. 21, XXIV. II.,) "Lignum ejus concisum furnis undique igni extra circumdate fervet. Primus *Sudor* aquæ modo fluit canali; hoc in Syria cedrium vocatur:" and "Cedrus magna, quam cedrelaten vocant, dat picem quæ *cedria* vocatur, dentium doloribus ultilissimum. Frangit enim eos et extrahit (the pains or the teeth?): dolores sedat.* Our modern Creosote is therefore but an old remedy revised. Pliny also affirms that *Cedria*, and especially its oil, was useful in elephantiasis and similar maladies. Dr. Walsh (on Coins,

* Dr. Hoffmeister, p. 367, describes the method of making cedar oil in Koonawur: it is also obtained from the cones. "Resinous cedar wood, cleft into many small pieces, is carefully squeezed into a new round pot, in such a manner that nothing can fall out when the pot is whirled round and round. It is then turned upside down over a copper bowl set in a little pit, every opening being filled up with small stones and moss. Round about the pot, a heap of billets of wood is piled up so high as entirely to cover it, and kept burning for fully two hours. Next morning the little pit is opened, and the

Medals, and Gems, p. 67,) tells us that "the elephantiasis was at this period (the reign of Gordian) a very loathsome and mortal distemper. It was so called because the limbs swelled into shapeless masses, divided by contracted rings, and the body, but particularly the face, was covered with blotches and papulæ like those of the elephant. Quintus Serenus, the Basilidian physician, who describes the disease, also prescribes the cure, which he says is the juice of the bark of the cedar tree.

"Est elephas morbus tristi quoque nomine dirus,
Non solam turpant infandis ora papillis,
Sed cita precipitans funesto fata veneno;
Hinc erit adversus cedri de cortice succus,
Varios sic ungere frontes,
Sic faciam, sic redde salutem."

The Creosote of Pliny was probably more potent in tooth-ache than the abracadabra of the Gnostic physician in tertian ague; but since each attests the vis medicatrix cedri, our *Kelon* oil is worth a trial in the cases of elephantiasis, leprosy, &c., unfortunately so numerous in India.

The association of Atys, the Phrygian Bacchus, with the pine tree, alluded to at p. 79, is not yet extinct. Our proverb "good wine needs no bush," is explained by the Continental practice, obsolete in England, of suspending a bush, commonly the head of a young pine, over the door of the vintner's shop. In Elme's Dictionary of the Fine Arts, we are told that the Greeks decorated their Pans, bacchanals, &c., with pine leaves; and that on several *bassi relievi*, the pine tree appears growing near the figures of Cybele and Atys. The Thyrsus of Bacchus was a lance, the iron head of which was hidden in a fir cone, (*Elmes,*) as may be seen in plate VIII. of Keightley's Mythology. Pliny says, "Pix in Italia ad vasa vino condendo maxime probatur Brutia;" and Loudon, (*Arboretum Brittannicum,*) "The cones of pines were used by the Romans to flavor their wine, having been thrown by them into the vine vats, where they float on the surface along with the scum that rises up

copper vessel removed, in which the cedar oil is found to have gathered in the shape of a thin liquid substance resembling tar. * * * It is used as a medicine, internally and externally, in cases of intestinal disease and in eruptions of the skin."

from the bottom, as may be seen in the wine tanks attached to inns and farm-houses in Tuscany and other parts of Italy at the present day. Hence the Thyrsus, which is put into the hands of Bacchus, terminated in a pine cone. Pine cones or pine-apples were in consequence much employed in Roman sculptures, and the latter application, pine-apple, has been transferred to the fruit of the *Ananas*, from its resemblance in shape to the cone of a pine. * * * * Throughout Attica the wine is preserved from becoming acid by means of the resin (of the *Peukas, P. Halepensis,* var *maritima*), which is employed in the proportion of an oke and a half to twenty okes of wine. * * * * The cones are sometimes put into the wine barrels." A writer in the *Westminster Review* has shewn the lineal descent of the vintner's "*Chequers,*" or sign of the Chess-board, from Osiris the Egyptian Bacchus, represented in England, at the present day, by the Chancellor of the Exchequer, and immortalized by the genius of Canning in the knife-grinder.

"Only last night, a —— drinking at the Chequers,
This poor old hat and breeches," &c.

Dr. Hoffmeister found the modern Corinthian wine undrinkable from the above mentioned dosing of resin ; but fortunate is the man who gets nothing worse.

Since the Hindoos, however, do not drink wine, and abhor the calling of the vintner, the sanctity of the *Deodar* cannot be connected with any such classical use of its cones or resin. In the absence then, of all records and traditions on this topic, we must consult the genius and the customs of the people ; and, guided by this clue, may not inconsistently come to the conclusion that it originally owed its fame not to its beauty or utility, but wholly to the fact of its being *a phallus-bearing tree,* the cones being regarded as so many lings ; and for this reason, we always find the tree planted by the temples of Muhadeva and Devi, the patron and patroness of that symbol.* The idea, it is true, strictly considered and in its most

* In a rough sketch of Kylas, by Captain H. Strachey, the sacred mount stands out from the average range, with sufficient resemblance to a cedar-cone ; and the name is probably from the same root, *kil,* to be white, as *kilimuh,* the *Deodar.* To this form it is indebted for its fame : being only 20,700 feet high, as measured by Lieut. R. Strachey, it yields to Goorla, on the opposite

apparent application, involves a physiological blunder, and is otherwise reprehensible in our eyes; but the Hindoo was contented with a certain congruity or natural fitness of the outward and visible sign, and is far from participating in our very modern fastidiousness. It remains to be considered whether the cone of Bacchus, Atys, &c., is not to be interpreted in this Indian sense; the symbol was evidently ancient and widely diffused, and with *the lotus* (equally mystical in the Hindoo system), is frequently represented on the sculptures recently discovered at Nineveh, and described in the *Athenæum.* Compare too Gibbon's account of the Syrian deity, selected by Heliogabalus as his chief object of worship. But the example of a Bishop, discussing alternately tar-water and Plato, can alone justify this and similar digressions.

The most southern point to which the cedar has yet been traced, is indicated in Captain R. B. Pemberton's report on the Eastern Frontier, where we find that "Cedars of gigantic size crown the summits of the loftier ranges, immediately west of Muneepoor;" an interesting region, which, with the Singfo mountains SE. of Assam, carrying the zone of perpetual snow furthest south in Asia, we may hope will be shortly illustrated by the researches of Dr. Hooker. Captain Pemberton's cedar is not absolutely certain; and some doubt must rest on the *Abies* or *Pinus cedroides* of Dr. Griffith, which he describes as common from 7,500 to 9,800 feet on the mountains of Bhotan, a tall handsome tree, with the habit of a cedar, attaining six feet in diameter, and occurring next below *Abies densa*, (*Journals*, pp. 245, 265, 266, 273, 276.) Dr. Hooker is inclined to think *Abies Brunoniana* is intended; but at p. 246, *both* are specified, (with the reservation indeed, that *A. Brunonis* itself was undecided,) and towards the end of the Journey, (pp. 276, 277, 286, 295,) all doubt seems to have ceased, and it is entered "cedar," without any qualification.* As Captain Pemberton was in company, we may suppose it to be also his Muneepoor tree.

bank, which is 23,900, to say nothing of still loftier points to the southward. The Ruldung or Chhota Kylas Peaks in Koonawur, though reputed a mere chip of the Tibetan mountain, are, in reality, higher, being 21,400.

* In a letter from Captain Pemberton, printed in the J. A. S. May, 1838, 461-2, "cedars" are twice mentioned: first on the Doonghala Pass, exactly

The *Deodar* has not been seen by Dr. Hooker, in eastern Nepal or in Sikhim: in central Nepal, Gorkhalees assure me that it is limited to the snowy range. In Kumaoon, it commonly occurs from 5,000 to 6,000 feet above the sea, in groves by the villages and temples; as near Lodh, Bala Jagesur, Gungoleehath, Furka, Lohooghat, Chumpawut; but though it has spread from some of these centres to a considerable distance, it is wholly unknown on the more remote and lofty mountains, occurs nowhere near the snowy range, and,

corresponding with Griffith's entry (p. 245,) of abundant *Abies cedroides*; and next on the Rodoola Pass, (pp. 257 to 259, inadvertently headed Dhonglaila Pass) where the Journals mention no pines but *Abies pendula, spinulosa,* and *densa.* Nevertheless Dr. Hooker informs me, that Bhotiyas who have seen the *Deodar* in the Darjeeling gardens do not recognize it, which strongly militates against the supposition of its being indigenous to their country: and the recent publication of Dr. Griffith's Itinerary Notes, (the completion of which—as a debt due to his fame and for their intrinsic value, we may hope will not be long delayed) puts the matter beyond doubt, and amply vindicates Dr. Hooker's view. *Abies cedroides* is there noted (p. 141, No. 663,) in terms which can only apply to *A. Brunoniana*: the leaves indeed are described as "distant," while Dr. Wallich, Pl. As. Rar. III. 24, calls and figures them "valde approximata": but the rest of the character, and especially the "strobilis terminalibus ovatis ovi pigeonis magnit," corresponds exactly. It may be added, that the long entry made by Dr. G. (p. 331, No. 34,) is a proof that he had not seen *Cedrus deodara* till he travelled in Afghanistan. So far, therefore, as European observation goes, I am not aware that we have any valid evidence that the *Deodar* is indigenous anywhere along the Himalaya east of Gurhwal. Dr. Mill states (J. A. S. July 1833, p. 343,) probably on the authority of Dr. Wallich, that it "abounds in the high regions of Nepal": and intelligent natives have corroborated the statement: but Dr. Wallich does not appear to have visited those districts, where the tree may be common, and yet no more indigenous than in Kumaoon. At page 63 of my original paper, "Pilgrim" (Mr. P. Barron) is cited as authority for the presence and great size of the "cedar firs" on Toongnath mountain; where, however, a personal search enables me to affirm that none such exist; the only firs are *Picea Webbiana* and *Pindrow,* and none of these attaining the girth and stature asserted by him. In like manner his "cedars" at Mirg are actually cypresses; and his cypresses along the margin of Nynee Tal are, as some one averred, whom he rashly corrects, willows. The accuracy of Moorcroft stands forth in constant contrast with the carelessness and errors of his followers into these regions: he is very seldom wrong: they are scarcely ever right.

I am persuaded, is not indigenous. Heber was misinformed as to its presence on the Gagur; this range exceeds the elevation of 8,500 feet, but is without a trace of cedar: its *Coniferæ* are *Cupressus torulosa,* which the good Bishop probably did not see; and *Pinus longifolia* in beautiful forests, which he must have taken for the cedar, as at Agra and Dehlee he invariably converts the Roopbas sandstone into red granite. That the *Deodar* has been introduced to its actual localities in Kumaoon is proved by the fact, that all the finest trees are found nearest the temples, where the first would naturally be planted, just as in Great Britain, the largest yews are those by the Churches. The Pilgrim to Budureenath and Kedarnath may occasionally be met carrying a young cedar as the most acceptable gift to the shrine, next to the Company's Rupee, which is everywhere the most sacred and all-sufficient.

The nearest truly indigenous habitat of the *Deodar* to Kumaoon is that noted by Moorcroft (p. 75,) in the vicinity of Josheemuth, where it is not uncommon on the mountains immediately north and east, and up the course of the Dhoulee and Vishnoo-gunga rivers. From Messrs. Batten and R. Strachey I learn, that it descends to the level of the former above Mularee, and is in abundance from Jooma to Phurkia, and Bumpa, 10,600 feet. On the Vishnoo-gunga, I found it commence on the floor of the valley at 7,000 feet nearly, a few miles above Pundkesur, evidently wild, but not abundant. Hence it extends upward to about 500 feet above the Rooringa Sanga, (considerably under 10,000 feet,) beyond which, birch excepted, there are no trees.* The glen of the Kaleegunga (to Kedarnath,) has no cedar: nor does it occur on any of the huge ranges NW. to the Ganges; at least on the line traversed by Dr. Hoffmeister. But (p. 498,) he writes in terms of admiration and in capital letters of the almost continuous CEDAR FOREST of the Bhagiruthee Ganges, and its affluents, especi-

* It is strange how universal the impression is amongst European writers, and travellers, that Gungotree is the most sacred shrine of the Himalaya: yet the truth is, that in comparison with Budureenath, it is in little estimation. The demands of the latter, and of Mana, for timber, not to mention the vast annual concourse of pilgrims, must have had a sensible effect in diminishing the forests.

ally between Duralee and Bhyrooghatee, which can be no other than that celebrated in the "birth of *Uma,*" as the *Deodara* of young Gunga: cypress or juniper being apparently too rare and remote to constitute a prominent feature in the scenery: nor is either mentioned by Dr. H. He states (l. c. and MS. penes me), that the cedar first appears in the bed of the river at Jhalla, extending thence even a stage above Gungotree, and up the Jahnuvee to Neelung; places, however, which he did not visit. Mr. Wilson supplies the deficiency in the *India Sporting Review,* December 1847, and June 1849, and from him Dr. Hoffmeister must have had his information. Describing the tree as growing in dense and noble forests from Jhalla, via Duralee (9,000), Bhyrooghatee (9,500), Gungotree, 10,319 feet, he tells us that thence up to the glacier the phenomena are these: "on the slope on the right bank the forest continues quite up to the glacier, broken only by landslips. At first cedar and pine are predominant, but these gradually disappear and give place to stunted birch trees, white *Rhododendron,* juniper, and other bushes. On the left, for the last 3 or 4 miles, the forest entirely ceases, and the slope is clothed with a rich and luxuriant vegetation of grass." This does not give the limit of the cedar, which is here probably under 11,000 feet; and it is remarkable how the account of the vegetation reaching up to the glacier coincides with what we know of the lower limit (about 12,000 feet) of other Himalayan glaciers, and induces a suspicion that the elevation (13,800 feet) assigned to the Cow's-mouth, is too much.

The gorge of the Jahnuvee or Jad Gunga, the more remote but still cis-Himalayan source of the Bhagiruthee, as far as Neelung probably 10,500 feet, is, in like manner, "covered in most parts with a forest of cedars," which cease in the next stage upward, Soonam, where no trees grow except a few willows and stunted cypress (more probably juniper).

SW. of Gungotree, in lower Gurhwal, extensive groves of cedar, apparently indigenous, occur on the flanks of Tyn Teeba, as at Oontur village, &c. and it is wild in profusion on Deobun, a fine mountain (9,000 feet) of Jounsar, between the Tons and the Jumna.

Beyond this, to NW. specification is needless; the cedar is established alike on the central and the culminating ranges, as far at

least as Tezeen in Afghanistan; here and at Olipoor (or Otipoor) Dr. Griffith (as already cited, *Journals*, pp. 461, 464. And *J. A. S.* No. 118, p. 798,) was inclined to believe that it ended abruptly: but there is reason to suspect its further extension. Dr. Robertson (*Calcutta Journal of Nat. Hist.* Oct. 1841, p. 330,) states, that "various species of pines (*Chulghozeh, &c.*) and CEDARS are found, along with the oak, elm, ash, and juniper," in the Kohistan of Kabul. This tract was not explored by Dr. Griffith; but the Passes to Bameean further west, have no forest of any kind: while the ambiguity of the term *cedar* in common parlance leaves it doubtful whether Dr. Robertson did not mean the tree juniper of Shawl and Bilochistan. The Afghans call the *Deodar* "*Nokhtur*:" perhaps from its pungent leaves.*

In Kashmeer, as I understand from Mr. Winterbottom, the cedar abounds on the Peer Punjal and Baramoola mountains, from 5,000 to 8,000 feet; but is rare on the east 'n ranges, the west faces of which are occupied, as usual, chiefly by *Picea*.

The NE. limits of *Cedrus deodara* are uncertain, but in all probability it never extends beyond the NE. face of the Himalaya. According to Dr. Lindley in the *Penny Cyclopædia* (copied in the *Arboretum Brit.* IV. 2429), two varieties, or perhaps nearly allied species, called *Shinlik* and *Christa Rooroo*, are mentioned by Moorcroft as natives of the forests of Ludakh† (if any such there be):

* Much probably remains to be discovered of the *Coniferæ* of their country. Lt. Irwin (*J. A. S.* November, 1839, p. 898,) says, that they "distinguish at least seven kinds" of pine, and notes the districts where they are found, but without any specification except the names *Julghozeh* and *Shouty*; the last (*P. longifolia ?*) "remarkable for its being so combustible, that the natives use it as a torch."

† This proviso is very necessary. I know not what materials Dr. Lindley consulted, but in the expurgated edition of Moorcroft's Travels, published by Professor Wilson, so far from any forest or cedar of any kind being mentioned, I find (I. 267,) that "a few willows and poplars are the only trees" in Ludakh. This is confirmed by Mr. Vigne (II. 342), with exception of his "here and there a bunch of fir trees" in the neighbourhood of Le, which, on the authority of Captain H. Strachey, I eliminate, as being imaginary. Captain S. assures me that the only trees are the Lombardy and a balsam poplar: willows: brier-bushes; and *Hippophäe* by the rivers: to these must

but the inhospitable soil and climate of the Tibetan table-land (where it freezes more or less every night in the year) must form an impassable barrier to the transverse progress of this and other Himalayan *Coniferæ*, excepting, perhaps, ***Juniperus excelsa*** : as, on the other hand, it and its continuation forbid the extension to the Himalaya of the larch, spruce, and pines of Siberia and the Altai. A cedar was, indeed, long believed to inhabit Siberia ; but Loudon (confirmed by Erman) shews this to be a mistake which originated in the Russian name for *Pinus Cembra*, "*Kedr*," being taken for cedar.

Masson (II. 25, 33, 152,) states that the plain of Lus, near Sonmeeanee, as well as the country between Sehwan and Kurachee, in

be added *Juniperus excelsa*, which, however, does not occur within 20 miles of Le, and is called *Shookpa*. In spite of the discrepancy of name, I concluded this to be Moorcroft's cedar, i. e *pencil*-cedar or juniper, and understood by Dr. L. of the *Deodar* ; but by comparing Moorcroft's volumes (I. 287, 289,) it is clear that *Christa Rooroo* is not a cedar at all, but doubtless *Hippophae* [illegible] *(salicifolia)* or some allied species : "a prickly shrub called *Cheerma* and *Chesta Ruru*," growing by streams, and producing a small, round, [illegible]ango berry, "too acid to be eaten." As *Chasta Rooroo* is "a variety or perhaps nearly allied species" of the *second* Ludakh cedar, it follows that the last, "*Shinlik*," must belong to the same family : probably the "*Sanjit*" or "*Sarsing*," (properly "*Sershing*" or gold tree) *Elæagnus Moorcroftii*, which also grows in Ludakh and Kashmeer, and of which Dr. Royle (in Vigne, II. 456,) mentions a Kabul variety "*Singilla*," which might easily in transcription become "*Shinjik*." "*Chirma*" in Tibetan denotes *any* thorn : properly *Tserma*.

The *Hippophae* forms the most abundant brush-wood of the river-beds in Ludakh, and though so common as to fix the notice of *all* travellers, has been, nevertheless, the subject of a second series of mistakes on the part of Mr. Vigne. He tells us (II. 360), that at a certain spot in the Nubra valley of Ludakh, "a long belt of *jungul*, chiefly of the Tartarian furze, occupies the banks of the river :" and in pp. 268, 269, 272, 319, as well as engraved on the map, near Khoppalu, on the Shayuk, the same shrub, explained to be *Cytisus Gerardiana* or *versicolor*, is said to occur in thick *junguls* on the stony and sandy banks of streams in Shighur and other parts of Baltistan. These are exactly the localities where we should expect *Hippophae*, while their comparatively small elevation would naturally induce a doubt of the presence of *Caragana versicolor*. But the matter does not rest on inference : Captain Strachey has visited the Nubra site, and he assures me that the shrub there is *Hippophae* : and so of course the rest.

Sindh, is "overspread with the magnificent *Dedar*:" associated with tropical trees, and flourishing in that burning climate, we must not confound this with the Himalayan *Deodar*: in his journey to Kelat, also, the *Deodar* is classed amongst trees common to Bilochistan and Hindoostan, and may be *Guatteria longifolia*, the *Deodar* of Bombay and Calcutta: but Richardson has *Deevdal* or *Deewdal*, Persian for the white poplar; and as both Griffith and Vicary mention a species of *Populus* in Sindh, allied to, if not identical with, *P. euphratica*, we may conclude this to be Mr. Masson's *Dedar*.

Captain A. Gerard fixes the lowest limit of the cedar, on a south aspect near Simla, at 6,436 feet, but the fact of its attaining a considerable size near the south cascade there, suffices to justify my lower estimate of 5,500; and Captain Hodgson, who says it flourishes most between 6,000 and 10,000 feet, adds that it occurs below and above those limits.—(*Gleanings in Science*, Feb. 1830, p. 52) Mr. Winterbottom informs me, that it descends certainly to 5,000 in Kashmeer; and it is quite at home at Hawulbagh, 4,000 feet, and ripens its fruit well, though not abundantly, at Almorah, 5,500, where it is equally an exotic. In some seasons, as this of 1849, there is a general failure of seed. On the northern face of the Busehur Himalaya, lat. 31° 30′, Captain Gerard assigns 7,414 feet as its lowest, and 10,943 feet as its highest limit; but it certainly descends much lower along the Sutluj, north of the Shatool Pass. Dr. Hoffmeister's limits are 8,000 and 11,000, of which the first is at least 2,000 too high. By his manuscript I find that he met scattered specimens only 300 feet below *Rhododendron campanulatum*, on the north face of the Harung Pass, above Sungla, in Koonawur: and we have seen that the tree reaches considerably above Gungotree, itself 10,319 feet: 10,500 feet must be, therefore, rather under than above the mark, for the upper limit on the southern face of the Himalaya. Captain Herbert expressly informs us (*Gleanings in Science*, Feb. 1830, p. 69), in contradiction of a report that he had seen the cedar at 13,000 feet in Koonawur, that 11,300 was the highest point at which he observed it; but Captain A. Gerard, who explored that district in every direction, says (Lloyd and Gerards, II. 296), "the *Kelon* seldom occurs below 6,000 feet, and its upper limit is nearly 12,000 feet: in a few favorable situ-

ations I have found the latter above 12,300." Two above 12,000 had been previously recorded (pp. 264, 267), viz. 12,300 near Soongnum, and 12,100 on the Werung Pass. Dr. Gerard measured *Deodars* of 13 feet in circumference, and 140 feet high, above the level of 10,600 feet (I. 6, I. 342). But this upper limit of 12,300 is proper only to Koonawur and similar climates, where the range of arboreous vegetation rises with the snow-line, as remarked by Mr. Colebrooke.

Further observation has overthrown an idea hazarded in the original paper, that the cedar shuns limestone formations: Shallee mountain NE. of Simlah, and Deobun in Jounsar, both of this rock, are well grown with cedar: in fact, with exception of the ranges, however lofty, next to the plains, it seems very indifferent to site and substance, flourishing equally amongst the clefts of the most scarped rocks, gneiss, quartz, limestone, granite, clay and mica slates, as in the black vegetable mould of the brae or glen, provided always the surface of the latter slope to an angle sufficient to ensure thorough drainage. This condition seems indeed essential to all our forests; even in the Turace a dead level is invariably grass jungle; but the moment a rise commences, the land is occupied by forest.

Although the *Deodar* abounds and attains a great girth on mountains thirty miles from the plains, all the gigantic specimens on record occur near the snowy range. On Choor, not one exceeded 17 feet round at 5 high; but at Sildes, near Looloot, on the western side of the Changsheel Range, there exists a hollow, flat-crowned patriarch, 36 feet round, at 4 from the ground; there is another of the same dimensions near the sacred fish tank below Cheenee, in Koonawur; and at Sheong, on the north face of the Boorun Ghatee, one of 33 feet. Dr. Hoffmeister (p. 504,) mentions "individual specimens above 40 feet in circumference."

Between Kugna and the Choor, there is a cedar forest in which nine-tenths of the trees were snapped in two by the snow of the winter, 1844-45; a sufficient proof that their *needle-leaves* do not preserve them from destruction by this cause, (p. 67,) which acts with peculiar force when frost succeeding a partial thaw is followed by a gale of wind. A little reflection, indeed, on the facts of the case suffices to demolish the theory alluded to; for the longest-

leaved pines, on which snow rests with most difficulty, as *Pinaster Halepensis, australis, longifolia,* prefer a zone in which it is unknown or comparatively rare; while *P. sylvestris, Picea Webbiana, Pindrow, pectinata,* with short stiff leaves and branches, well calculated to arrest the snow, flourish exactly where it falls most copiously. Whole forests of some of these may be observed dead in many places from Bhotan to Buschur, as well as in the European Alps, for which no cause has been assigned; but lightning seems the most probable (compare, however, note, *ante*).

Dr. Lindley *(Veg. Kingdom,* 227,*)* remarks, that Dr. Brown "has noticed a very general tendency in some species of *Pinus* and *Abies* to produce several embryos in a seed:" both in Kumaoon and Buschur we frequently meet cedars with several stems from the very base, which may proceed from the same cause.

Dr. Hoffmeister not unjustly terms the cedar "the crowning glory of the Himalayas"; and Baron Hügel (account of Kashmeer)must be added to the list of those who eulogize "the incorruptible Himalayan cedar, the invaluable *Deodar.*" As long ago as 1845, I suggested to the worthy and zealous Editor of the Medical and Literary Journal the propriety of experiments to ascertain if the timber really repels the white-ant; in which case, and if it could be brought to the spot at a cheaper rate than kyanized materials, it would be invaluable in forming the sleepers of our Indian railways: but looking at railway prospects, the cedars are probably not yet planted, which will be required on any line above Allahabad.*

The occurrence of larch in Bhotan and eastern Nepal has been noticed: in the abstract of the Flora of Lower Koonawur, p. 515, Dr. Hoffmeister enters "*Larix*" "very rare"; but, as if he had afterwards seen reason to doubt its correctness, any such allusion is omitted in the letter to M. Humboldt. Captain A. Gerard, also, *Account of Koonawur*, pp. 204, 206, mentions "several larch trees" near Kotgurh, and "a species of larch" on Huttoo; but none such exists. Since my original notes were drawn up, I have visited Bulsun and Joobul, the States in which Fraser also notices two varieties of the same genus: but diligent observation and enquiry satisfy me

* Prospects have brightened considerably since this was written.

that *Cedrus deodara* is intended; the "two varieties" being no other than the ordinary conical (or where compressed, columnar) form, and the somewhat rarer specimens with broad tabular crowns. Below Chansoo, near Sungla, a steep ridge from the Buspa is grown and feathered with enormous trees of this form, which is due to the loss of the leading shoot by storms, and sometimes apparently by birds perching on, and wearing it down. Rosenmüller quoting Burckhard's Travels in Syria, says of the cedar of Lebanon, "the oldest cedars are known by the circumstance of the foliage and small branches being found only at the top. This seems to be pointed out by the Hebrew word Tzammereth in Ezekiel, xvii. 3, "the highest branch of the cedar," and xxxv. 3, "his top was among the thick boughs." Loudon too, observes, "the summit in young trees is spiry, but in the old trees, it becomes broad and flattened." In a lesser degree this is true also of *P. longifolia, pinea,* and *sylvestris,* which, as they grow old, lose the lower branches, and acquire rounded or spreading crowns by the development of the uppermost boughs, and the decay of the rest.*

* In the botanical portion of Berghaus' Physical Atlas we are told, that *Pinus cedrus,* the cedar of Lebanon, as well as the *Deodar,* inhabits the Himalaya, for which I think there is no other authority, unless this be intended to intimate their identity. The site of the latter is said to be "the Alps of Nepal and Tibet, at a height of from 10,000 to 12,000 feet: an English editor had the means of discovering that there is no proof of its presence in Tibet, and that at Simla, &c. it descends to 6,000 feet.

The same work furnishes the following distinctive habitats of our *Coniferæ,* amusing as samples of critical variety of expression employed to disguise a total ignorance of details:

Pinus Webbiana. "The cold regions of northern India."

Pinus Brunoniana. "Northern Provinces of India."

Pinus Smithiana. "Mountains adjoining the Himalaya."

In one page we are told that *Quercus semecarpifolia* forms the limits of trees at 11,500 feet on the south face of the Himalaya, which is true enough; but in the next page, the same level, with the same aspect, is assigned as the limit of shrubs, juniper, *salix, ribes;* which is necessarily and naturally false.

It is asserted that "snow is unknown" below 5,000 feet. In the Gleanings in Science, April 1830, p. 116, we have the notorious fact recorded, that in 1815 it fell at Kalsee, on the Jumna, at 2,500 feet; and "lay deep" on the Sewalik range, from 2,000 to 3,500. This was repeated in the winter of

It would appear, that even on its native mountains (p. 64) the cedar of Lebanon affords timber little if at all superior to the coarse, soft, warping wood of the English specimens. Pococke, in 1744-45, examined the trees on Lebanon, and says, "the wood does not differ from white deal in appearance, nor does it seem to be harder," in the "*British Gunner*" its specific gravity is given 613: that of Indian cedar 1315; but this last cannot be the *Deodar*, which, on an average of twenty trials by Captain W. Jones, shews only 680.

The *Deodar* grafts freely on the cedar of Lebanon; the village of Eden, the chief or only site where the latter remains, is 6,400 feet above the sea. Authorities differ as to the number of cotyledons; some allowing only 6, others from 9 to 11, which agrees with the *Deodar*. "The female catkins are produced in October, but the cones do not appear till the end of the second year, and, if not gathered, they will remain attached to the tree for several years," but in the *Deodar*, they are produced and fall to pieces annually: and Roxburgh was certainly misinformed when he was led to represent the scales as "so close as in general to prevent the escape of the seeds without help." On the contrary, the cones break up spontaneously while still on the tree, as soon as they are ripe; and hence, when Moorcroft visited some *Deodar* groves in Kashmeer, he was disappointed in procuring seeds. This is a marked difference: but its glaucous leaves would scarcely warrant a specific distinction, for, in the *Arboretum*, Loudon mentions a variety of *Cedrus Libani*, "the silver cedar," with leaves quite glaucous. In general, however, the distinction here also holds good, for even on the oldest *Deodars*, the shoots and tufts of fresh leaves, from April till June, are of a light blue-green, which, in immediate contrast with the dark foliage of the last season, imparts during these months a curious mottled appearance to the tree: on many trees this tint is permanent.

1846-47, when it fell at 2,500 or lower in the Dehra Doon, and certainly to 3,000 at Bagesur, in Kumaoon. In February 1836, I am assured snow fell at Bilaspoor, on the Sutluj, 1,465 feet. These, no doubt, were exceptional seasons, occurring at long intervals; but their possibility is a very necessary element in a view of botanical geography: while *every* severe winter snow falls, though it rarely lies, a thousand feet below the zone, where this work affirms it to be unknown.

Dr. Rosenmüller, following many ancient versions, is of opinion, that the Hebrew *Berosh* denotes the cypress, not the pine or fir, as rendered by our translators; and thus the temple of Solomon, with doors and floor of *Berosh*, may have been indebted for its durability to the cypress rather than to the cedar of Lebanon. He shews that the former entered into the construction of many other temples of antiquity. Thus Pliny (XVI. 42,) states, that the doors and other parts of the Ephesian Diana's temple were of cypress; and Athenæus describes a splendid ship of Hiero, containing, amongst other articles of *vertu*, a shrine of *Venus*, incased in cypress wood. The German critic would include under *berosh*, *Cupressus sempervirens*, *Thuja articulata*, and *Juniperus Sabina*, which last was called *Brathys* by the Greeks, adding their own termination to the Syriac form *berosh*. (*Brathys* has recently been applied to some species of *Hypericum*,—a division rejected by Dr. Lindley.) Pliny (XII. 39,) adds, that the *Bratus* grew on Mount Zagros (the range east of the upper Tigris), and that it resembled the cypress, with wood having the odor of cedar. The passage of Arrian, referred to p. 88, is in B. VII. c. 19, of Rooke's translation: "The same author (Aristobulus) also tells us that Alexander had ordered cypress trees to be cut in that province for building several other ships, they growing there in great plenty." Our own experience proves how mutable are names amongst the *Coniferæ*: or it may be that the original or vague term *berosh* of Solomon's time, had at the epoch of the Captivity, become obsolete, or yielded to the more precise appellation "*gopher*," of which was constructed the ark; cypress, according to Rosenmüller, who remarks that *copher*, pitch, *gapherith*, sulphur, and *gopher*, in the Greek from *kupar*, are cognate terms in sound and sense. *Copher* also signified, he supposes, our *Mendee*, *Lawsonia inermis*, and perhaps the several odoriferous *Cyperi* (Κυπειρος) may be traced to the same origin.

With respect to the plant noted, p. 78, called *Lotus* by Pilgrim, the *Kumul*, *Kunwul*, *Kouwul*, of the Brahmans and mountaineers from the Shatool to the Oonta Dhoora Pass, it is not, as I supposed from his and Fraser's description, a *Fritillaria*, but a composite plant, *Saussurea obvallata*; the same name is also applied to *Saussurea sacra*: and Mr. Edgeworth remarks—(Linnæan Transactions,

in voce :) "In templis apud Badrinath sanctissimis Indorum pro Nelumbio uti donum in sertis offertur : ideo "sacram" nominavi ; hoc usu in templis Kedarnath, Tungnath, &c. *S.* (*Aplotaxis,* DeC.) *obvallata* occurrit, ambœ a monticolis Indicé *Kunwal* (id est *Nelumbium*) appellantur." I have not observed the *Nelumbium* above Bheemtal, 4,300 feet ; *Saussurea obvallata* does not descend below 12,000, and reaches 15,000 feet ; it is not an aquatic, but the large leafy bracts, enclosing the flowers, are shaped like the petals of the lotus, which, with a musky fragrance, have raised it to its actual honors. *Iris napalensis* is known in Kumaoon as the "*Neel Kumul,*" blue lotus ; and *Crinum toxicarium,* as "*Chundur Kumul,*" white lotus : both are commonly to be found near temples and the abodes of *fukeers* or other religious men.

Luminous plants, p. 79. Vague ideas of their existence in India and the neighbouring countries float about now as in the days of the old Hindoos and Greeks ; they are in some cases, perhaps, founded on facts, in others on electric appearances. In the *J. A. Soc. Bengal,* No. 153, p. 688, we read that in Afghanistan "to the north of Nahoo, is a mountain called Sufed Koh, in which the natives believe gold and silver to exist, and in which they say *in the spring* is a bush which at night *from a distance* appears on fire, but on approaching it, the delusion vanishes." Baron Hügel (p. 143,) was told, that the Auk river in Kashmeer, when swollen with rain, brings down from Tibet pieces of timber which "shine in the dark as long as they continue moist." Our officers at Peshawur might, perhaps, find out some particulars of the Sufed Koh vegetable luminary ; the account, if a fiction, is at all events an old one, and seems identical with that given by Pliny (XXI. 36,) of the "Nyctegretum" of the text ; which is this :—

"Nyctegretum inter pauca miratus est Democritus, coloris hysgini, folio spinæ, nec a terra se attollentem, præcipuam in Gedrosia narrat. Ervi *post æquinoctium vernum* radicitus, siccarique ad lunam triginta diebus, ita lucere noctibus. Magos Parthorumque reges uti hac herba ad vota suscipienda. Eamdem vocari chenomychon quoniam anseres a primo conspectu ejus expavescant (!) ab aliis nyctalopa, quoniam *e longinquo* noctibus fulgeat."* The rootstock

* Gladwin's Ulfaz Udwiyeh has *Siraj-ul-Kootrub,* the fairy's lamp : a plant which shines at night like the glow-worm.

of a plant from the Ooraghum jungles, at the foot of the Madura hills, near Trichoor, supposed to be an Orchid or Marica, was exhibited in April 1845 at a meeting of the Royal As. Soc., possessing "the peculiar property of regaining its phosphorescent appearance when a dried fragment is subjected to moisture, gleaming in the dark with all the vividness of the glow-worm or the electric *Scolopendra,* after having been moistened with a wet cloth applied to its surface for an hour or two; and it does not seem to lose the property by use, becoming lustreless when dry, and lighting up again whenever moistened." The *Gardener's Chronicle* (Dr. Lindley) states, that "a small slice of the dried root being wrapped in a wet cloth, and allowed to remain about an hour, shines in the dark like a piece of phosphorus, or perhaps somewhat paler, more like dead fish or rotten wood." It is stated to have been long familiar to the Brahmans under the name of *Jyotismati,* erroneously referred in the Lexicons to *Cardiospermum,* perhaps on account of the white crescent on its black seed. The discovery of the Coromandel plant was made by a Tuhseeldar, compelled by rain to take shelter at night under a mass of rock, where he was astonished to see a blaze of phosphoric light over all the grass in the vicinity. Sanscrit authorities refer the *Jyotismati* to the Himalaya: and on enquiry at Almorah, I found there was a luminous plant well known there by that name, and "*Jwalla-mat;*" implying the possession of light or fire. It turned out to be *Anthistiria anathera,* of which perhaps one root in a hundred is luminous by night during the rainy season. Other grasses, *Andropogon contortus, Iwaruncusa, &c.* are reported to possess the same property; and both Hindoos and Moslems are persuaded of the existence of a plant called *Sunee* (the Sanscrit *Sunjeevun:)* extolled for its power of revealing the wonders of fairyland; and eagerly sought by *fukeers* and *serpents.* In 1845, the people of Simlah were open-mouthed with a rumour that the mountains near Syree were illuminated nightly by this magical herb. But it is probably *Dictamnus,* which has occasioned many of these reports: it abounds near Gungotree and Jumnotree, and supposing it to exhibit the same phenomena as its European congener, the fame of a bush burning but not consumed would be bruited afar by the pilgrims among a people ever ready to deify any

peculiar manifestation of fire.* Professor Henslow explains the inflammable atmosphere generated, on a calm still evening about *Dictamnus fraxinella* by the evaporation of a volatile oil: and states that, "If a candle be brought near it, this plant is enveloped by a transient flame without sustaining any injury from the experiment." The Rughoovuns alludes to fire latent in the *Sumee*, supposed to be *Prosopis spicigera*, the *Jhund* of northern India: but the reference may be to fire obtained by friction.†

On *Brasil* wood (p. 88) Rosenmüller quotes Kimchi on II. Chrons. ii. 8, to the effect that "the Arabic *bukum* denotes the wood commonly called *Brezil*. Celsius thinks it strange, that not only Kimchi, who lived about three centuries before the discovery of America, but also, Maimonides, who lived somewhat earlier, have

* Many facts prove that some general knowledge of the Himalaya was obtained thus; in some cases, the results of observation, true to the present day, have been blended into the national legends. Ward somewhere relates a story how Yoodishthira, wandering in these mountains, and who alone of the Pandoo party, reached heaven alive, was followed by a dog, to which he became so attached, that on reaching the celestial gates, he absolutely refused to enter without his companion: the St. Peter of the day and place being, after a long resistance, obliged to give in. Perhaps no party now ever makes an excursion in these mountains without being similarly joined.

† The state of Natural History in India reminds us continually of Pliny, and the mass of facts, fiction, shrewdness, and credulity there preserved:—occasionally its revelations rival the most recent experiments or speculations of our own philosophers. Bhubdev Teewaree, and other learned pundits of Almorah, affirm that the fact or fable of the transmutation of the cerealia by means of frequent cutting or browsing has been known in India from time immemorial: the late Mr. G. T. Lushington informed me, that the same belief prevails at Bhurtpoor. According to Bhubdev, wheat becomes barley; barley, wild oats (*Avena fatua*); rice, *Panicum furmentaceum*; while *mundooa*, *Eleusine corocana*, degenerates into *Khurooa* or *Jhurooa*, which seems to be *Eleusine indica*. They do not seem to have any tradition as to how and where the finer cerealia were obtained. Dr. Griffith (p. 3,) mentions the wild form of *Oryza sativa* as common in Silhet.

The doctrine of spontaneous generation is universally received: thus, at Almorah, flies are believed to originate in the dreadfully offensive spadices of *Sauromatum punctatum* and *Arum hastatum*: fleas, lice, bugs, &c. in sweat: scorpions in a preparation of buffaloe's milk: mint from the excrement of flies fattened on goor and honey: and so on.

both mentioned *Brazil* wood, whereas it is commonly supposed to have derived its name from the Province of Brazil in South America, whence the best kind is brought by the Portuguese. But both the wood and its name were known long before the discovery of America, as is manifest from extant documents of the fourteenth century, from which Charpentier has given extracts in his Glossary, under the words *Brasile, Brisiacum, Brisillum.* From thence it appears that the name *Brasil* or *Brazil* was used to denote any brilliant color, as well as the substances from which it was prepared."

The word occurs also in Chaucer's Canterbury Tales, l. 15, 465, "Nonnés Preestes Tale,"

> "Him needeth not his color for to dien.
> With Brasil, ne with grain of Portugal."

One of his editors quotes in illustration, an inventory of the effects of Henry V. containing the following items—"II. graundes peces du Brasile, pris VI. *s.* VIII. *d.*" Dr. Rosenmüller adopts Kimchi's opinion, that the *Almuggim* wood imported from Ophir by Solomon, is identical in sound and sense with the Arabic *Al-bukum,* well known in Indian commerce as sapan, the produce of *Cæsalpinia Sappan.*

It is curious to find the word established so early in Ireland, where, in Armagh, was the district Hy-Bresail, or "the sons of Bresail;" now Clan-Brassil; also a "Rath-Brassil," Brassils Fort, and several more. In O'Connor's child placeed in A.D. 1315, Campbell calls one of the characters Brazil. It is asserted that the "Isles of Brazil" are located in the neighbourhood of the Azores in maps of the fourteenth century, and were laid down by Ortelius in his map of Europe more than 300 years ago. The author of the MS. History of Ireland, preserved in the Library of the Royal Irish Academy, mentions "O'Brasil" as "an island which lieth far out at sea on the west of Connaught, and is sometimes perceived by the inhabitants of Uaile and Iris (Erris), and also from St. Helen's Head in Donegal." He goes on to affirm that it appears in many old maps in long. 13°, lat. 50° 20′, and notes that Captain Rich had seen it at a distance, for it vanished on being approached. This learned critic surmises that the Isles of O'Brasil are inhabited by the *Tuatha Danaans,* "so that it may be those famous enchanters now inhabit them, and

by their magic spell, conceal their island from foreigners;" not without good reason. In 1675, a fictitious account of a voyage thither was published; entitled "O'Brasil or the Enchanted Island," being a perfect relation of the late discovery and wonderful disenchantment of an island on the west of Ireland. "Giraldus Cambrensis, A. D. 1350, calls it the Phantom Island; says it appears on *a calm day;* that two vain attempts were made to reach it by a boat; but on the third day, by shooting towards the shore, an arrow tipped with red hot iron (altogether inimical to any thing that is fantastic), they landed, and found the soil firm and habitable:" a very palpable non-sequiter! In Colgan's *Acta Sanctorum,* St. Brendan is stated to have reached this land in a coracle from Kerry, and to have continued there seven years: in proof of which, a promontory in that country still bears the Saint's name. The island is still occasionally seen by the men of Clare, Antrim, and Irishowen, (*Otway's tour in Connaught, &c.* whence these details are taken,) and may owe its existence to three causes: 1st, fact, embodied in the well-known usquebaugh of that classic district: 2nd, the effects of refraction, as the Fata Morgana of the Straits of Messina, &c.: 3rd, a tradition of the discovery of North America in the tenth century by the north men. Be this as it may, the word must be originally Celtic, while the fact is certain that the actual kingdom of Brazil derived its name from the wood or the fictitious island, as the Antilles were so named from Antilia or Atlantis, an equally imaginary land of the mediœval and earlier maps and traditions; and very possibly based on the same phenomena as O'Brasil itself.

(To be Continued.)



THE JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

On Himalayan Coniferæ—being a Supplement to the "Brief observations," &c. Journ. of the Agri. and Hort. Soc. Vol. IV. Part IV. BY MAJOR E. MADDEN, *Bengal Artillery.*

(Concluded from page 128.)

VIII. CUPRESSUS TORULOSA.—The Kumaoon designation of this tree is *Soorui*, the Sanscrit *Soorahvu, Soorahvyu*, from *Soor*, a deity, *ahvu*, appellation: "named divine." Professor Wilson, after the Umurkosh, explains the word by *Pinus deodara*, with which indeed it is considered, in some districts, equally sacred: and it is likely that the authors of the Koshas were not acquainted with the difference. *Soorui* (*Soorye*) is clearly the *Shoor* of Koonawur, there applied to *Juniperus excelsa* as well as to the cypress, which Dr. Hoffmeister found growing in company on the south face of the Wyrung Pass (*Travels*, p. 501): but in the Narrative, pp. 407, 437, 444, 458, he frequently mistakes *Juniperus excelsa* for this tree.

Supposing *Cupressus torulosa* to be *C. pendula*, of Dr. Griffith's Journals, its most southern known habitat is Bhotan, where (204, 222) he met with it, (but perhaps never wild,) at elevations varying from 2,160 to 7,000 feet above the sea, but apparently cultivated at Dewangiri, the lowest of these levels. He adds (*J. As. Soc.* April 1839, 276,) "The only ornamental tree to which the Bhotiyas are particularly attached is the weeping cypress; these occur about all the castles and palaces, and especially about religious buildings." In Sikhim, Dr. Hooker has only met with it by the convents on the Great Runjeet river, where it is probably introduced: "*Chundung*" of the Bhotiyas and Lepchas; and perhaps the *Cupressus funebris*, figured in Macartney's Embassy to China. "A most beautiful tree: wood yellowish-red, and very odoriferous."—(*Dr. Hooker.*) I do not find any notice of its existence in Nepal, but it is not wanting there, as Mr. Winterbottom got specimens from Gosainthan. In the British Himalaya, its appearance is first recorded by Captain Henry Strachey on the Nirpania Dhoora in Choudans, on the west bank of the Kalee. Advancing NW. it occurs in great forests on the western face of the Kaleemoondee Range, separating the Ramgunga from the Goree or Gouree river; here Messrs. Winterbottom and R. Strachey in 1848 found it prevailing from 7,000 to 8,000 feet, on the Pass of the same name from Ghirgaon to Moonsharee. Somewhat further west, scattered woods occur on the route from Almorah to Devee Dhoora, and at Nynee Tal it forms a very marked feature in the scenery, constituting an extensive forest on the steep SE. face of Cheenur, and the SW. face of the Boorans-ka-Danda; as well as on the same aspect of the Giwalee cliffs, on which it reaches down to 5,000 feet, its greatest elevation on Cheenur being about 8,000. Sporadic clumps and separate trees also grow on the NE. face of the same mountain, on the Sher-ka-Danda, Uyarpata, &c. but it chiefly affects the warm exposures. Dr. Hoffmeister mentions (p. 494) "the northern acclivities" of Cheenur as the site of the main forest, meaning, apparently, those north of the lake: he only allows a height of 40 feet, which is greatly underrated: many trees are certainly 100, and some perhaps 150: the largest specimen measured by me is 16¾ feet in girth at 5 from the ground, the spread

of the branches about 24 feet on each side; but about 12 feet is the average girth of the finer specimens at Nynee Tal, where the tree is commonly called *Raisulla.* It seems unknown as an indigenous production in NW. Kumaoon; but in SE. Gurhwal, it is in abundance on the upper Nundakinee, at Wan on the Kylgunga, and other drainers of the Trisool: and in lower Pynkhunda, from Josheemuth upwards, on the way to the Neetee Pass, Mr. Batten (*J. As. Soc.* April, 1838,) describes it as abounding from 7,000 to 8,000 feet: "after leaving the oaks, elms, hornbeams, &c. the wood becomes entirely cypress, and from summit to base of the mountains no other tree is seen. The larger trees not unfrequently attain an enormous size, some of them having a girth of 27 feet. The smaller kinds are, however, the prettiest, and even *appear* to be different from the larger in species: but on observing them attentively, I perceive no difference whatever in reality between what some travellers call the *Arbor vitæ* and the large Himalayan cypress." The ground or creeping cypress, "*Parpinja*" of Mr. Traill, referred to p. 92, is *Juniperus communis:* but *Cupressus torulosa* at great heights is itself dwarfed down to a mere bush, the form assumed by pines, and in fact everything in this district above Mularee. There can be no doubt of the correctness of Mr. Batten's concluding observation; the old trees, in a suitable climate, grow up in a slender column, like the *Pindrow* and *Webbiana* firs, and except that, on a closer inspection, the foliage is of a yellowish-green, considerably resemble them in their sombre color and monumental form; the thick, contorted boughs, also, give the individual tree a somewhat naked, savage, and distracted aspect: but up to 40 feet or so, the form is full of grace, conical, with dense tiers of horizontal boughs, from which the branches droop in the most elegant manner. The forests of the Dhoulee, near Josheemuth, are those noted at p. 93, from Moorcroft, who very correctly pronounced them cypress. The famous cypress grove at Mirg, 4 or 5 miles SE. of Josheemuth, stands on the NE. aspect of the mountain at 7,500 feet elevation, surrounding the temple of Chundika Devee. Most of the trees are from 12 to 16 feet round: but there is one of 27 feet, measured flush with the ground on one side; 10 or 12 feet above it on the other: it is branched nearly to the base, with

enormous root-bole embracing large rocks: and is probably not under a thousand years old. Towards Gungotree, west of Duralee, the cypress is called "*Soorui*" and *Leor* or "*Lewur*," and hereabouts, I learn from Dr. Falconer, it is not uncommon: the same traveller informs me that it occurs in profusion on the mountains between the Jumna and the valley of Ramaseera (Ramaserai of the map): and I have already (p. 109,) remarked its existence at Mooshk, in this province. Hence, I am unaware of its existence NW. till we reach the Simlah districts, where, as already mentioned, it occurs in Kotkhaee, and plentifully on Shallee mountain, in Bhujee. The inhabitants in their own dialect call it *Gulla*, *Gullai*, *Gulrai*; and they consider "*Debdar*" "*Deodar*," by which term also it is familiar to them, to be of Hindoostanee origin. Of the clumps at Kotkhaee, the largest two trees measure at 5 feet, 14 and 14½ feet round respectively. On Shallee, it is found in most abundance on the crags and cliffs of its northern spur called *Thela*, at about 8,000 feet; but, in a dwarfed state, it occurs to 9,300 feet, within 300 feet of the summit. At the base of the mountain, in the Nawur or Noule Glen, there are some fine specimens as low as 4,500 to 5,000 feet; its limits, as a tree, may therefore be fixed at 4,500 and 9,000 feet; but, when introduced, it flourishes considerably lower, as at Hawulbagh, 4,000, and Dewangiri, 2,000. Like the cedar, it seems indifferent to geology: growing on clay-slate at Nynee Tal, dolomitic limestone on Shallee, gneiss and mica slate on the Dhoulee; but a dry and somewhat sunny site seems essential. Respecting its extension NW. it is marked by Moorcroft up to Mundee, as already noted (p. 85), but certainly does not reach Kashmeer. In Kumaoon, the cypress flowers in January and February, in small, solitary terminal 4-sided strobili, about one-fourth of an inch long, each side comprising five ovate scales. Each of the almost countless branchlets ends in one of these: the cones are placed lower down.

The people of Kumaoon do not appear to have the cypress in much religious veneration: on the contrary, the timber is freely used in the houses: at Nynee Tal it is considered very durable, but too flexible for any position where it has to sustain heavy weights: for such, oak is preferred. In Bhujee, on the contrary,

I was assured that death would infallibly follow the profanation of the divine timber to any useful purpose of economy: it is burned as incense solely. The Himalayan cypress, however, may be available for other purposes than incense and architecture. Sir E. Belcher (*Voyage round the World*) informs us, that at the Russian settlement of Sitka, about lat. 58°, on the NW. Coast of America, the most valuable timber is a very fine-grained bright yellow cypress (*C. Nootkaensis?*), of which they build boats: the natives of Nootka Sound manufacture their cloaks of its inner bark: "it turns the rain, is very pliable and soft, and is in use for mats, sails, ropes, clothing, &c. The roofs of their houses are also covered with it." The people of Bank's Island turn it to the same uses.

The conjecture of the text, that the form of the Gothic architecture was borrowed by the northern nations from the combinations of their pine forests is put aside by the fact of its Arabian origin; which merely transfers the type to the palm: perhaps to the evergreen cypress we are indebted for the graceful minaret, as we certainly are for some graceful poetry. Byron introduces it into one of his most impressive pictures, when he places himself

> ———— "Within the Coliseum's wall,
> 'Midst the chief relics of almighty Rome.
> Some cypresses beyond the time-worn breach
> Appeared to skirt the horizon, yet they stood
> Within a bow-shot—where the Cæsars dwelt,
> And dwell the tuneless birds of night."

While Carlyle (confounding Moliere's axiom, "all that is not poetry is prose—and all that is not prose is poetry,") raves of "a whole cypress forest, sad but beautiful, waving with not unmelodious sighs in dark luxuriance, in hottest sunshine, through long years of youth." According to Theophrastus, it was dedicated to Pluto, because, when cut down, it never throws up suckers; while, from its long duration, imperishable timber, and evergreen foliage, it was styled the tree of life. It was understood in the former sense during the first age of reason and balled cartridges, when the terrible line of Dante was inscribed over the Parisian catacombs,

Lasciate ogni speranza voi ch' intrate!

On the restoration, a better taste and a sounder policy substituted, in allusion to a spring close by, a more cheering text (St. John iv. 13, 14): and this remains, (or did so till lately) "to teach the Lutetian moralist to die," if such education be possible or requisite where Theophrastus is preferred to the Evangelist. In Italy the name of Napoleon is pleasingly associated with the cypress: at Soma, near Milan, grows (or did till 1842) a patriarch of this race, fully 20 feet in circumference, and popularly believed to be co-eval with Julius Cæsar. To save this and connect his own fame with the Romans, the emperor consented to divert the Simplon road a few yards from the otherwise direct line; the result is, that, of the hordes of Goths and Vandals who still annually invade Italy, not one in a hundred but devotes a few minutes to the contemplation of Napoleon and the cypress.

We have seen the cypress of one or other species, sometimes confounded with the juniper, as it still is by botanists and travellers in the Himalaya, venerated and planted by temple, tower, tomb, palace, and garden, from time immemorial amongst the Celts, Italians, Turks, Syrians, Abyssinians, Persians, Hindoos, Chinese, Bhotiyas, as the tree of life; and still known as "*Soorahvyu*," the divine tree. In Kosmos, we are told by Baron Humboldt that "the parks of the Persian Kings were adorned with cypresses, of which the form, resembling obeliscs, recalled the shape of flames of fire, and which, after the appearance of Zerdusht (Zoroaster) were first planted by Gushtasp around the sanctuary of the fire-temple.

It was, perhaps, thus that the form of the tree led to the fiction of the paradisaical origin of cypresses. The Asiatic terrestrial paradises (παραδεισοι) were early celebrated in more western countries; and the worship of trees goes back among the Iranians to the rules of Hom, called in the *Zend-avesta* "the promulgator of the Old Law." In the Notes, he adds: "in the Shah Namah of Firdousee it is said, a slender cypress, sprung from paradise, did Zerdusht plant before the gate of the temple of fire" at Kishmeer, in Khorasan. "He had written on the tall cypress tree that Gushtasp had embraced the true faith, that the slender tree was a testimony thereof, and that thus did God extend righteousness. When many ages had passed over, the tall cypress became so large that the hun-

ter's cord *(laso?)* could not go round its circumference. When its top was furnished with many branches, he encompassed it with a palace of pure gold, *** and caused it to be said abroad in the world, where is there on earth a cypress like that of Kishmeer? God sent it me from paradise, and said, bow thyself from thence to paradise. When the Caliph Mote-Wekkel had the sacred cypresses of the Magians cut down, this one was said to be 1450 years old.*** The cypress, in Arabic *Arar* wood *(aod)*, in Persian *Serw (Suroo) Kohé*, appears to be originally a native of the mountains of Busih, west of Herat;" for which fact the geography of Edrisi is appealed to. Captain Mignan *(J. A. S.* Sept. 1834, p. 457,*)* found "a few bushes of the melancholy *wild* cypress" on the mountains of NW. Persia, near the Araxes. The "cypress jungle which covers the inlet from the (salt?) swamp" near Sonmeeanee, as well as "a small grove of cypress trees, noted by Captain Hart, in the same vicinity, are probably *Tamarix orientalis*, the *Furas*, as distinguished from the *Jhau*, his *Tamarisk.—(Journey from Kurachee to Hinglaj*, *J. A. S.* No. 98 of 1840.)

The *Visulya* tree (p. 80) is, by the Pundits of Kumaoon, referred to *Croton polyandrum*, the leaves of which are in high repute as a healing plaster for wounds: while the sap is believed to have the power of corroding iron. There is a handsome species of *Bridelia (montana?)*, a tree in the Turaee, but little more than a shrub on the mountains, where it is called *Kurngnulia* and *Guya*, which really possesses this power; at least it covers the blade of a knife with a glossy black pigment. But these fall so short of the gaudy description of the legends, that we must rather assign the *Visulya* to one of the ornamental *Crotons*, as the *Codiæum chrysosticton*, an exotic common in Bengal gardens, and perhaps first known to Hindoos in their expeditions to Java, &c. and exaggerated according to their custom. The *Parijata* tree, says the Vishnoo Poorana, (by Wilson,) "was produced when the ocean was churned for *Ambrosia;* the bark was of gold, and it was embellished with young sprouting leaves of a copper color, and fruit-stalks bearing numerous clusters of fragrant fruit." Krishna, and his wife Sutyubhama ("Beautiful tree") see it in Nunduna ("delight"), the garden of Indra, the regent of *the East.* She

begs him to transfer the *Parijata* to Dwaruka; "I long to shine amidst my fellow-queens, wearing the flowers of this tree in the braids of my hair." According to the Hureevuns, her desire was excited by Narud's presenting one of its flowers to Krishna's other wife, Rookminee. At the expense of a war with Indra, Krishna removes the tree; "the smell perfumed the earth for three furlongs, and an approach to which enabled every one to recollect the events of a prior existence: so that on beholding their faces in that tree, all the Jaduvas contemplated themselves in their (original) celestial forms." It is impossible not to perceive the relation between these Indian supernatural trees, and those of the Hebrews; the accessories are all of the same complexion, and bespeak an extravagance of imagination eminently Indian.

Thuja orientalis, pp. 84, 91, is generally known in Northern India, as the "*Majoo*"; no doubt from the external resemblance of its fruit to the gall-nut.

IX. JUNIPERUS.—The Greek name *αρκευθος*, proves how early and how extensively prophylactic powers were attributed to this genus in Greece anciently, as to this day in the sequestered regions of Tibet. Schrevelius gives the etymology "*παρα το τεν αραν Κευθειν*; quod maledictionem arceat. Ejus odorem omnia, Sc. reptilia aversantur." Captain A. Gerard, (p. 126,) thus describes the *Lapcha* of Upper Koonawur: "on the tops of many of the houses are square piles of stones, named *Lapcha*, adorned with juniper branches; and on the road side are heaps of stones, with poles, rags, or flags inscribed with mystic words, and each passenger adds a piece of quartz or twig of juniper of the large kind, called *Shookpa*." At Doobling, Dr. Hoffmeister (436, 437,) mentions cypress employed as a *chowree*, no doubt to scare away the demons from the threshing floors; but juniper is intended; for at Namgia, which is close by, he correctly states (p. 501,) "*Juniperus* prevails alone." His words are—"Beside them stood a censer, round which, as often as a sievefull had been shaken out, they circled three times with slow and measured step, strewing cypress leaves upon it, and waving over it a large bunch of cypress twigs, after which they resumed their work." Pliny (XXIV. 36)

writes of his two varieties of common juniper "utraque accensa, serpentes fugat;" and, "Sunt qui et perungant corpus a semine ejus in serpentium metu." In another place he says of *J. Sabina*, "a multis in suffitus pro thure assumitur:" just as *Juniperus excelsa, squamosa* and *religiosa* are called *Dhoop* and *Googgul* in the Himalaya, and the wood burnt as such. Amongst the apparatus of the temple at Simonbong, in Sikhim, Dr. Hooker mentions "censers with juniper ashes," while, amidst the ceremonial mummery, "incense was brought of charcoal with juniper sprigs. This was muffled about, and put through many evolutions," &c. (*J. A. S.* May, 1849, pp. 444, 445.) The natives of Duru in Gilgit, says Mr. Vigne, (II. 305) "on a particular day burn goat's fat and juniper branches upon the altar, and dance, sing, and drink wine," &c. At Hanu we were presented with incense-dishes, in which were small branches of dwarf juniper frying in goat's grease. This species of juniper has been called *Juniper(us) religiosa* by Dr. Royle, &c. But the plant in question was probably *J. excelsa*, which Captain Strachey found above Hanu, at 12,000 feet.

"The ancients (says Loudon in the Arb. Brit.) consecrated this shrub to the furies, and threw its berries on the funeral pile to protect the departing spirit from evil influences * * * *. They also burnt it in their dwellings to keep away dæmons: a similar custom still prevails to a certain extent in various parts of the Continent, where the peasants believe that burning juniper branches before the doors will prevent the incantations of witches, and keep away evil spirits." "The Bashkirs, a people of Russia, between the Volga and the Ural, use fumigations of *Savin* to cure the diseases of children; they also believe it to have a great effect against witches, for which purpose they hang branches of it at the doors of their houses." But the superstition exists, or lately existed, nearer home than the banks of the Volga. In Brand's Popular Antiquities (I. 10, III. 148, of Sir H. Ellis' edition) "Mr. Pennant tells us, that the Highlanders on New Year's Day burn juniper before their cattle;" and the Rev. Mr. Shaw, in his History of the Province of Moray, (where the shrub is very common,) that "when a contagious disease enters among cattle, the fire is

extinguished in some villages round; they then force fire with a wheel, or by rubbing a piece of dried wood upon another, and therewith burn juniper in the stalls of the cattle, that the smoke may purify the air about them; they likewise boil juniper in water, which they sprinkle upon the cattle: this done, the fires in the houses are re-kindled from the forced fire. All this, he tells us, he has seen done; and it is, no doubt, a Druid custom." It perhaps originated in the rich aroma of the wood and fruit; and the fumigation which is so efficacious in ridding man and beast of "the torment of mosquitos," gadflies, and gnats, may have come to be considered equally potent against spiritual mischief. But another principle may have dictated the canonization of juniper, as it certainly has that of several other Himalayan plants; viz. vicinity to the imaginary deities of the elevated situations where they naturally grow, and where man himself can scarcely breathe. Thus several *Saussureas* of the highest zone of vegetation are consecrated in the temples and rustic altars under the sacred name of lotus: while, in respect to juniper, the sentiment would be strengthened by the properties attributed to *Savin*, rendering it specially auspicious to children.

1. *Juniperus excelsa.* Dr. Griffith does not name the species, but this is probably one of those which he found in Bhotan, flowering in March; though at Milum, in Joohar of Kumaoon, *J. excelsa* appears to flower in October and November. "At a temple near Jaisa (9,400 feet) found the juniper of Oongar in flower, attaining a height of about 40 feet:" exactly that of *J. excelsa* observed at Chitkool by Dr. Hoffmeister. In another place, near the superior limit of *Picea densa (Webbiana)*, Dr. G. came on a juniper, "which, in proper places, becomes a small but elegant tree." At 10,000 feet, "*Juniperus*, very fine, occurs:" and between 8,900 and 10,000, "*Juniperus fruticosa*, (frutex humilis) raro arbuscula, ramulis pendulis, foliis lineari-lanceolat, acuminato spinulosis." We may here probably discern *J. recurva* and *squamosa.* (*Journals*, pp. 265, 275, 276, 266, *Itinerary Notes*, p. 149, No. 733.) Dr. Hooker can detect but two species of juniper in Sikhim: he writes to me "I made six or eight species till I saw them growing; there is a regular gradation in the size of the

berry. The weeping juniper grows in the damp woods." The last I believe to be identical with what Dr. Hooker, in a subsequent letter, describes as the "*Desheu*" of the Bhotiyas, a "rather glaucous tree, 15 to 25 feet high, at elevations of 10,000 to 12,000, or perhaps 13,000 feet. Branches pendulous: leaves subulate; bark scaly: heartwood red, odorous, like *J. Bermudiana.*" This seems to be Dr. Griffith's "small but elegant tree," and probably *J. recurva* of Don, which, according to Loudon's *Arboretum*, forms "a graceful bush or low tree." Dr. Hooker continues: "the *Abies* forest of Kunchinjinga is immediately succeeded by the tree juniper in valleys and the dwarf on the ridges, that is, when the impenetrable *Rhododendron* scrub does not intervene." Thus the tree juniper occurs exactly in the same zone as in Bhotan, viz. the superior limit of *Abies Webbiana*. In a second letter, Dr. Hooker gives its Bhotiya name "*Chokpo*;" no doubt the same term as "*Shookpa*" of Koonawur and Ludakh, and in fact, as Captain Strachey assures me, the proper Tibetan name of *Juniperus excelsa*. According to Dr. H. the *Chokpo* is "a large, black, densely branched, stiff tree, growing from 60 to 80 feet high in eastern Nepal, in Sikhim not above 15 to 20. Bark more scaly than in the former species: heartwood the same: always burned in the temples, and makes excellent light mountain staffs, but splits too easily. Leaves quadrifariously imbricated. Rarely found below 11,500 feet, and gradually dwarfing into an alpine creeping shrub at 12,000 to 13,000. Ascends in this form to 13,000 feet on the south flanks of Kunchinjinga, and to 15,200 on the rearward ranges. Young plants of both dwarf and arborescent varieties have spreading subulate leaves, as have often the terminal branches. These are not distinguishable from the former species. A puncturing *Cynips* often produces false cones, when the leaves become subulate." This dwarf form ascending to 15,000 feet, will, I suspect, turn out to be *J. squamosa* of former botanists: present in many situations in the British Himalaya where there is not a trace of any arborescent juniper.

North-west of Sikhim, &c., *Juniperus excelsa* is next mentioned in Nepal Proper on Gosainthan, where it seems to be called "*Googgul-dhoop.*" In Kumaoon it has hitherto, as far as I know, been

identified only about and above Milum, which is beyond the influence of the periodical rains: here, at 11,500 feet, Messrs. Strachey and Winterbottom observed a few stunted trees, known, in the present Hindee dialect of the villagers, as "*Pudmak*," the *Pudma* of p. 95; a Sanscrit term proper to *Cerasus Padam*: the application to juniper is, however, pretty general, for *J. squamosa* is called "*Pudbank*" in Byans, and *J. communis* "*Pudma*" at Neetee. In SE. Gurhwal, Lt. R. Strachey observed *Juniperus excelsa*, associated with both these species, as low as 9,000 feet, near Jelum, on the Dhoulee (or Neetee) river; and was assured by Bhotiyas that it also occurs in the glen of the Girthee, a Trans-Himalayan feeder of that river, from the Oonta Dhoora Pass. Fraser's *dhoop* below Gungotree may be cypress; but (*Gleanings in Science*, Feb. 1830, p. 52,) General Hodgson mentions that, when Captain Herbert went up the Jahnuvee branch of the Ganges towards Neelung, he found the "Juniper cedar in the form of a small tree," marked in the map at 11,123 feet. Dr. Hoffmeister (p. 504,) observes that it "extends to a more elevated habitat than any of the other *Coniferæ*; on the Upper Sutluj is the only tree, as also on the declivities sloping towards the table-land at Shipkee, where, however, it becomes shrubby." The tree appears to resemble the *Pinus Gerardiana* in its general preference of the arid climate of the Tibetan regions. Mr. Winterbottom found it on all the elevated tracts of Astor and Gilgit, and even in the NE. quarter of Kashmeer, nearly on a level with the valley, which reduces its lower limit in that latitude to about 6,000 feet, its probable level in Shawl also: Mr. W. suggests that these Kashmeer specimens may be the juniper mentioned as growing in the valley by Mr. Vigne, which, from his description, I supposed to be *J. squamosa*.

North-east of Kashmeer, *J. excelsa* occurs in Ludakh from 11,000 to 12,500 feet, affecting, Captain Strachey informs me, the most precipitous localities; e. g. in the upper half of the Nubra valley: on the river Shayok, NE. of Le: along the Indus valley: below that city, from Himis-shookpa-chen (or Himis of the great junipers) to, and perhaps beyond Hano: and probably in Zanskar also. From this to Siberia, the chain, if any such exist, has yet to be traced.

About Doobling, near Shipkee, the tree abounds at 9,000 feet, the same elevation with Jelum on the Dhoulee; and its lowest limit known to me in the Himalaya, excluding Kashmeer. On the south face of the Himalaya, Captain A. Gerard assigns 11,213 feet as the lowest level: and 11,842, its highest on the north face; but this is certainly too little, for, in Upper Koonawur, as on the Binung Pass and near Soongnum, it probably reaches 12,500, the superior limit assigned by Captain Strachey in Ludakh: Captain Gerard states 25 feet to be the average height.

Drs. Royle and Hoffmeister agree that *Cupressus torulosa* reaches Koonawur, where, following the analogy of Kumaoon, it would be termed "*Shoor*" or "*Sooruee.*" Hence the impossibility of unravelling the contradictory statements of several travellers. Captain Gerard mentions beds of *Shookpa* juniper at 10,500 to 13,000 feet, and says it is different from the *Shoor* and *Bidelung*: *Shoor* here probably means *J. excelsa;* but *Shookpa* is clearly wrong: the *bed* juniper being only known in Koonawur as "*Theloo*" and "*Pama*:" in fact in the *J. A. S.* No. 126, for 1842, he expressly gives *Shoor* as the Milchan, and *Shookpa* as the Bhotiya term for *J. excelsa:* and Captain A. Cunningham (*Ib.* March 1848, p. 212,) mentions several clumps of the pencil-cedar, *J. excelsa,* above Ranee-kee-Kotee, in Lahoul, "called *Shúr* by the Lahúlis, and *Shúpa* or *Shúpka,* by the Ladakis and Bhotis:" and (*Ib.* No. 148 of 1844, p. 249,) "The juniper is called *Lewr* about Rampoor, *Shoor* in Koonawur, and *Shookpa* in Bhot." And so also Captain Hutton, *J. A. S.* Nov. 1839, 929. I have myself heard the great trees at Leepee, &c. called *Shoor* and *Shirkoo.* In the account of Koonawur, pp. 68, 69, Captain Gerard corroborates Captain Cunningham: "The juniper appears to be of three sorts: one, called *Pama,* is an immense creeper; another, *Shoor* or *Shookpa,* is a tree of 15 or 20 feet, on which are a few cones; and the third, a bush named *Bettir*" in Bhotiya, no Milchan name being given; probably *J. communis.* He adds, "the only juniper that is eatable is the creeping juniper, the rest being very bitter": and in his Journal of 1821, II. 99, he notes near Oorcha, east of Nisung "the *Pama* or creeping juniper, and abundance of *Shookpa* or the species that grows to 20 feet high." But in the Appendix (pp. xxiv.—

xxvi.) we have quite another account: "some *Shookpa* and *Shoor* juniper are met with, the latter never above two or three feet in height": and, noting that the *Bidelgung* juniper commences at 11,300, he adds "*Bidelgung* and another kind of juniper, *Shookpa,* continued to the height of above 13,000 feet": "extensive beds of *Shookpa* juniper." Again, at 9,000, 10,165, and 11,800 feet "we found a new kind of juniper called *Shoor,* which is quite different from the other sorts, the trees growing to the height of twenty-five feet and upwards, and branching out from the bottom." This is *J. excelsa;* which I think never reaches, far less exceeds, 13,000 feet. Between Ropa and Soongnum, the "*Shookpa* juniper" (II. 264,) reaches 12,350 feet: this is also *J. excelsa,* and is its highest recorded site; it also occurs as a tree at Nako, 12,000 feet, p. 167. Dr. Royle, (p. 351,) says—"The former (*Cupressus torulosa*) appears to be the plant called *Theloo* by the natives, and seen by Hurree Singh, between Simlah and Fagoo, &c." Cypress certainly grows there, but not the *Theloo* juniper, which Hurree Singh pointed out to me in the Seharunpoor Garden by that very name: but he knew it never grew near Simlah, to which Choor is the nearest habitat.

According to Loudon, *Juniperus excelsa* extends to Siberia (where in fact it was first discovered), and even to the rocky mountains of North America. In some memoranda of a journey in Koonawur in 1830, it is represented as "a beautiful tree, which would be a great ornament to an English Park: but in these bleak mountains it is so exposed to the pelting of the storm, that many of the trees, though large, are much distorted." The small bungalow at Soongnum is "shaded by the largest juniper tree I have seen: 5 or 6 feet from the ground it measures 13 in girth: the stem soon divides into two great boughs, each of which throws out large spreading branches." At Leepee or Lippa, "one side of the village church is nearly formed by a fine *Shirkoo* tree, which shades the whole building." Dr. Hoffmeister calls this a cypress (p. 407), and the same mistake occurs (437, 444, 458), but it is really a juniper as Captain Hutton states (*J. A. S.* Nov. 1839, 929). Dr. H. observes, that the Erreng or Wyrung Pass is "remarkable from the fact that on its southern slopes the *J. excelsa* occurs simultane-

ously with the *Cupressus*. Both being in fruit they could not be confounded." This tends to explain the confusion in Captain A. Gerard's nomenclature: he never mentions cypress, and some of his species of juniper may be this in its stunted form: Captain P. Gerard used to speak of a bushy juniper of Koonawur producing a fruit as large as that of *C. torulosa*, from which, however, he thought it distinct. Moorcroft, on the contrary, never, I think, recognizes the juniper tree: he says (I. 211) of Darcha in Koolloo, at 11,000 feet: "on the tops of some of the houses, I observed piles of horns looking like chimnies, decorated with branches of cypress;" but the usual practice prefers juniper, as Dr. Gerard observed (II. 95) on the tumuli at Nisung: *J. excelsa* is preferred for these holy sprigs, as well as for incense, and is commonly planted by Bhotiya or Buddhist temples: but at Panwee temple, north of Shatool, I noticed a fine bush of *J. squamosa* (or a variety) considered very sacred, and also called "*Dhoop*" "*Googgul*:" Dr. Royle's epithet *religiosa*, for his new but undescribed species, is therefore not discriminative.

The timber of *J. excelsa* is known in Koonawur as "*Lewr*," "*Newr*," or simply "*Dhoop*." Captain Gerard states, that "*Porwa*," vessels of juniper wood turned at Soongnum, are in much esteem: this has been denied as to the material; but I have examined some, and can testify to Captain Gerard's correctness. Captain J. D. Cunningham (*J. A. S.* No. 147, of 1844, p. 218) calls these cups "*Puriveh*," and says "the best kinds are made of the knot or excrescence of a tree called in Kunawur *Kauzal** and about Rampoor, *Laor*:" but this last is identical with *Lewr* (juniper).

In hand specimens, on a cursory inspection, the cypress and tree juniper may be easily confounded: the former, however, though the ultimate ramifications are very numerous, has them much shorter and less pendulous than the cypress, and the green is more brilliant. The leaves are closely imbricated in decussate pairs "somewhat obtuse, with a central gland or raised line on the back: 4-ranked and imbricate: or slender, acute, disposed in threes and

* Perhaps a misprint for *Kun-shin, Acer sterculiaceum*, from the knotty parts of which the coarser sorts of Tibetan cups are made in Byans.—*Captain H. Strachey, Journey to Cho Lagan.*

spreading" (Loudon). Both forms may be seen on the tree at Leepee: but specimens from Milum have the imbricated leaves only, and the dorsal gland is rather depressed than raised. Dr. Griffith, *Itinerary Notes*, p. 145, No. 696, and p. 159, No. 819, appears to have met specimens presenting both forms: his plate 62 represents the former, also with free leaves. The fruit ripens in September, October, of a purplish-blue color, the size of a small pea, 1 or 2-seeded, resinous, with strong aroma when bruised.

Masson (II. 74, 81,) describes a juniper, probably this species, growing 20 to 25 feet high on the limestone declivities and summit of the lofty Chuhul Tun mountain, in the Kelat territory, where it is called *Upoorz* or *Upoors* by the Brahooees. He states it to be abundant, and valuable as fuel and timber; with berries esteemed in medicine, and exported to India. At a pilgrim station Mr. Masson observed a large tree "covered with rags and tatters, and around its trunk stones were placed, defining a *musjid*:" the primitive superstition having in this, and so many other cases, survived the shock of Islam. In the journey to Kelat (p. 450,) he says "the *Appurs* or juniper cedar seems more peculiar to the mountains of Saharawán. It contributes by its solemn and majestic appearance to the scenery of the hills, and is the wood principally used at Kalat for purposes of building and fuel. It abounds on the eastern ranges of Saharawán and on Chuhul Tun, delighting in the superior regions. It bears clusters of berries which are gathered when perfected, and sent for sale as medicines to Sindh and Hindoostan." The tree is said to be the *Hurhur Kohi* of Persian authors, and may be the cypress of the Magians. On the Toba mountains, near Kundhar, Dr. Kennedy (II. 136) saw some fine old spreading junipers, with knotty trunks, and small purple berries: no doubt the Biloch species. It appears to extend from Gilgit to the Kafiristan mountains, for Masson (I. 212) tells us, that the river Kow or Alingar (the Χοης and Χοασπης of the Greeks;) "when swollen by the melting of snows, or by rains, brings down to Lughman branches of an odoriferous wood supposed to be sandal, but which is, likely, the juniper cedar." When Gutzlaff (*China Opened*, II. 236,) includes the "Siberian cedar" among the *Coniferæ* of Nertchinsk, on the confines of Mongolia,

he probably means *Pinus Cembra,* which doubtless supplies the Chinese with "*Neoza*" nuts.

Following the steps of so many of his predecessors in Eastern travel, Mr. Masson expatiates in the fields of etymology, and disfigures his books by conjectures and assertions more learned but not less infelicitous than those of Vigne, &c. already commented on. Thus in vol. III. 199, 200, after Wilford, a dangerous guide, who himself often lost his way, he fearlessly derives Palestine from *Palistan,* land of Pali, though it be merely the Greek form of the Hebrew Palesheth, and has nothing to do with *sthan:* tradition and language too, pointing equally to a Semitic origin of the Philistines. The Phœnicians, says Mr. M. "we know to be Pali:" how? every remaining name of person, place, object, in book or coin, proves beyond doubt, that they used an Arabian dialect. Again; their capital Tyre, or more correctly "Tur" was anciently, according to Strabo, called "Pali-tur" or "the Pali fort," as Mr. Masson interprets it: but the geographer writes Palæ-tyrus, which is very orthodox Greek for "old Tyre," the original continental city, as distinguished from the later one on the island, taken by Alexander. The Hebrew Zur or Tzur signifies "a rock," and hence probably Ezekiel's promise that the place should be a rock for fishers to dry their nets on: nor has the word any probable affinity with *turris,* for the Latin name was Sarra. Mr. M. may be nearer the mark as to the Palatine hill: for considering the affinity of Latin and Sanscrit, Pales, the goddess of flocks and herds, may very well be allied to the Indian Pala, a shepherd, or cowherd. M. Court de Gebelin derives the word *etymology* from the Hebrew *tum* or *thum,* Coptic *thmei,* perfection, truth; but such examples as Messrs. Masson and Vigne afford, only tend to the idea of "perfect" nonsense, and to bring the pursuit into discredit and ridicule with many, unaware of its interest and certainty, when pursued by the light of legitimate rules and analogies, with a constant regard to the affinity of nations and languages, amongst which few have less in common than Sanscrit and Arabic.

"Alfana vient d' equus, sans doute;
Mais il faut avouer aussi
Qu'en venant de la jusq'ici,
Il a bien changè de route!"

Sir William Betham has been considerably laughed at for maintaining in "the Gael and Cymri" the identity of the Phœnician and Erse. Yet it cannot be denied that he has, by a juxta-position of the latter language with the speech of the Carthaginian slave in the *Pænulus* of Plautus, made good a surprising coincidence in sound and sense. But neither he nor his critics appear to have calculated the chances that the slave was a Celt, who would naturally speak tolerable Erse: yet, in reading Polybius, &c. we find that scarcely any of the Carthaginian troops were Carthaginian citizens, but almost exclusively, Spanish or Gallic mercenaries, whose mother-tongue would in many cases, be Celtic, between which and Phœnician, a Roman poet and audience were not very likely to know the difference, any more than to trouble themselves by the enquiry whether a slave from Carthage was necessarily a Carthaginian by birth. According to Sir William, the slave makes a vow—"grateful fires on stone towers will I ordain to blaze to heaven"—an early and undoubted allusion to the round towers or their prototypes, which other antiquarians reject on the ground that a Carthaginian slave would not speak Celtic, and that the towers are of Christian origin, as they probably are, but of so early a date that they may well be derived from Pagan times.

The common juniper is called in Celtic, *aitinn*, *aiteann*, *achill*: in German, *wachholder*; of none of these have I the means to discover a probable etymology. Pliny (XVI. 40,) denies that *Picea*, *Pinus*, *Larix*, *Juniperus*, "ullo flore exhilarantur;" and then *improves* his fact as to the last: "Quidam earum duo genera tradunt; alteram florere, nec ferre; quæ vero non floreat, ferre protinus baccis nascentibus, quæ biennio hœreant. Sed id falsum: omnibusque iis dura facies semper. Sic et hominum multis fortuna sine flore est!"

2. Juniperus squamosa.—Dr. Griffith, *Itinerary Notes*, p. 145, No. 695, apparently met this species on Rodoola in Bhotan at 12,000—12,300 feet. Don (*Prodromus Floræ Nepalensis*, p. 55,) describes it on Hamilton's authority, as growing at Narainhetty, which he tells us, correctly too, in his preface "est prope Kathmandu, Nepaliæ metropolim;" and that "Narayani nomen proprium est apud Nepalenses celebritate gaudens!" But the eleva-

tion being little more than 4,500 feet, we may be certain this and many other plants to which he assigns the same habitat, are exotics or, much more probably, merely there labelled by Dr. Hamilton, whose residence it was during his visit. It is common on the snowy range of Kumaoon and Gurhwal, where the Khusiya names are "*Bhedara,*" "*Jhora,*" "*Bil;*" but Captain H. Strachey found that the Bhotiyas of Byans call it "*Pama,*" by which it is also known to their brethren of Upper Koonawur. Behind Milum in Joohar, and Neetee in Pynkhunda, it penetrates into the heart of the Himalaya, occurring below Topee-dhoongee and at Rimkim, about 14,500 feet, between the Oonta Dhoora and Kyoongur Passes; but does not extend more to NE.: the elevated plain and bitter climate of Hoondes (Tibet,) being too much even for this hardy shrub. It occurs in abundance in the valley of the Dhoulee, below and above Neetee; Dr. Jameson shewed me specimens from Gothing, 13,000 feet, and Mr. Batten *(J. A. S.* April, 1838, p. 314,) fixes its upper limit thereabout from 14,500 to 15,000 feet, which is also the limit in Koonawur. Its lower limit on the Dhoulee is 9,000 feet, near Jelum. I found it in abundance between 12,000 and 13,000 feet on the Glacier-moraines of the Vishnoo Gunga and Kedar Gunga, at Budureenath and Kedarnath. Dr. Royle affirms that the juniper "reaches almost the line of perpetual congelation;" but in the Tibetan climates it falls short of that line by about 4,500 feet. On the southern face of the Himalaya its upper limit is not well ascertained: Dr. Hoffmeister gives 11,500 as the general limit, but it certainly reaches 13,500, which is still 2,000 short of the snow-line. General Hodgson found the shrub near the sources of the Bhagiruthee, and thus describes it *(Gleanings in Science* for February, 1830, p. 50,)—"I found it at our bivouac near the sources of the Bhagiruthee, at the height of 12,914 feet above the sea. It there had the form of a large creeper (not of a tree), some of the branches were six inches in diameter, and of a considerable length; in some places they were above the spongy soil; and in others below the surface. We used it as fuel: the wood has the same red color, brittle and soft grain, and pleasant smell as the pencil wood," i. e. *J. excelsa.* No doubt Loudon, *(Arboretum Brit.* IV. 2504,*)*

correctly identifies this species with "the bastard or creeping cedar" of travellers, which Dr. Royle (*Illustrations*, 351,) had not ascertained. He gives the Choor as a habitat; and there I found it forming extensive beds, often overlying the huge tabular masses of granite, which occur on and near the summit, 12,000 feet; its only name there is "*Googgul*," incense. Dr. Hoffmeister, in ascending from the Bhagiruthee Ganges to the Lamakaga Pass, mentions (pp. 345, 399,) that "a species of juniper, "*Taroo*" (or "*Taloo*") from the berries of which an intoxicating drink is prepared, forms the under-wood" above the forest zone. The name is but a variation of "*Theloo*," "*Teloo*," "*Thiloo*," by which the shrub is known all over the Busehur Himalaya: it may come from "*daroo*," spirituous liquor, in allusion to the Brandy or Whisky distilled from its berries. On the Boorun and Yoosoo Passes of the Busehur Himalaya, the Gerards (I. 364, II. 34,) determined its highest limit to be 13,300 and 13,400 feet respectively, by independent observations. As we advance into Bhotiya Koonawur, the limit rises: thus at Pamachun, near the Manerung Pass, it occurs at 13,700: Rukor, 13,985, has "beds of *Pama* juniper." Reeshee Eerpoo, 14,800, "a few juniper bushes:" on the Roonung Pass, above 14,500, "creeping juniper." Dr. Gerard, writing of this locality, October 25th, says, "we found a great deal of juniper on the way, and the berries were large and well tasted, having little bitterness." Captain Hutton, however, more acutely, distinguishes *two* junipers on the Roonung and Wyrung Passes (*J. A. S.* Nov. 1839, pp. 929, 930): on the latter, "scattered over the more open parts were beds of juniper and *Tilloo* (also a species of cedar used as incense);" and on the south aspect of Roonung "were spread vast beds of junipers.* * * * Further up, these beds of junipers increased, and were intermingled with another species growing more like a bush, and the same as is known at Leepee, (*i. e.* on the Wyrung Pass) by the name of *Tilloo*." In ascending the south face of the Wyrung Pass to Jungra, Dr. Hoffmeister says, "The pines and cedars gradually become stunted; at length they make way for cypresses ("*Leeoora*") and juniper ("*Taloo*,") which cover the entire slope of the hill on which our tents were to be pitched for the night. * * * (Here) bushes of thorny, blueish-green

juniper and dwarfed cypresses formed a thick copse all around." There seems some confusion here: Dr. Hoffmeister's cypress is probably *Juniperus squamosa,** and his blueish-green juniper Captain Hutton's second species, *Tilloo;* no doubt *Juniperus communis,* var *alpina.* Little dependence can be placed on native names thus clashing: in Captain Gerard's vocabulary, *Pama* and *Phuloo* are given as the Bhotiya or Tibetan equivalents of the Koonawuree or Milchan *Thiloo* and *Bidelgung:* and the limits of this last are said to be 11,369 and about 13,000 feet; but he mentions "another sort" called "*Bettir,*" of which only a Bhotiya name is given: and which, as *J. communis,* seems restricted to the Bhotiya tracts, I take it to be it.† On the north side of the Kimleea Pass, only a

* In the letter to Baron Humboldt (p. 501), we read however, "the Erreng Pass is remarkable from the fact that on its southern slope the *Juniperus excelsa* occurs simultaneously with the *Cupressus.* Both being in fruit, they could not be confounded." For the last remark we are indebted to some observations of my own, made to the zealous, talented, and amiable traveller only two months prior to his premature and lamented end. The *tree* juniper is not mentioned in the text.

† In complete uncertainty as to the true nature of Dr. Hoffmeister's "*Cupressus,* nova species" (p. 504), I may here insert some remarks on his description, premising that Messrs. Traill and Batten had long since noticed a "ground cypress" of our Alps. He says, pp. 496, 356, "on the mountains above Mookba, at an elevation of 11,000 feet, a very dwarf cypress is met with, covering large tracts." "Beyond the snowy Pass of the Lamakaga, 16,000 feet in height, appears among the sources of the Buspa, a cypress of very low growth, which supplied us with fuel. I believe this to be a new species of cypress, distinct from *C. torulosa.* It grows at an elevation of from 14,000 to 15,000 feet, and also occurs again at the point where the bed of the Buspa assumes its contracted and rocky character, a day's march and a half lower down, where it is clearly recognized as different from the *Juniperus* by the inhabitants of Chetkool, who find it of no use in the preparation of juniper brandy." "The dwarf cypresses afforded us from their long roots, which creep far under the blocks of travelled stone, a sufficiency of wood for fuel." In the Appendix, p. 504, "Growth shrubby, sociable, covering large tracts. * * * *Vegetational limit,* from 11,000 to 16,000 feet above the sea, at the sources of the Goomtee and Buspa." Now, if Dr. H. had seen the fruit, there would have been no room for calling in the opinion of the people of Chetkool; and it is curious that in the text (pp. 345—7,) the only shrub mentioned is the "*Taroo,*" from which no doubt the spot, elevated 11,272 feet, near the sources

few miles west of the Lamakaga, Captain Gerard, at 13,000 feet, came on "abundance of juniper bushes," which he does not distinguish from *Pama:* which last everywhere occurs in the arid Tibetan tract, east of the Ruldung or Chhota Kylas group, reaching near Charung to 14,300 feet. The climate, soil, elevation, are here so similar to those of Lamakaga, that I presume this to be Dr. Hoffmeister's new creeping cypress. Beyond Koonawur, I know of no sites of *J. squamosa* till we reach Kashmeer and the regions adjacent, where Mr. Winterbottom informs me it is common at all great heights. Dr. Griffith got a *Juniperus* named "*Whishtur*" from the Kafir (Katoor) mountains, north of Julalabad, but does not mention its stature; no juniper of any kind occurs in his enumera-

of the Goomtee, is named *Phoolal Daroo.* Nor though, as we have seen above, "dwarfed cypresses," "*Leoora,*" are mentioned on the Wyrung Pass, is there any allusion to them in the text? From the remarks of Dr. Gerard, Captain Hutton, and from the name, these at least would appear to be *Juniperus squamosa*, which there can be no doubt is also the plant met by Hodgson and Gerard on both flanks of the Lamakaga Pass: and described by the former in terms very similar to those employed by Dr. H. Now, as will be noticed in the text, there are two widely different varieties of *Juniperus squamosa*, one with acute spreading leaves, found at 12,000—13,000 feet: the other—no doubt the typical form—with imbricated cupressiform leaves, and extending nearly to 15,000 feet, where Dr. H. finds his creeping cypress. Now, had he in the first instance, fallen in with No. 1, and concluded it to be *J. squamosa*, he might (in the absence of fruit,) have very easily taken No. 2, for a cypress. I am inclined to this solution, as the true ground cypress, the dwarfed form of *C. torulosa*, does not, to the best of my belief, ever reach anything like 15,000 feet elevation. At Bumpa towards the Neetee Pass, and at an elevation of 10,350 feet, Mr. Batten associates it with birch, currants, gooseberries, *Pinus excelsa, Caragana versicolor, Rosa sericea* and *Webbiana, Juniperus squamosa.*—(*J. A. S.* April, 1838, p. 312. "The ground is covered, as well as the surrounding heights, with beds of ground cypress." But from more recent researches by Lt. Richard Strachey, I know that it does not reach Neetee, 11,464 feet. Though Mr. Traill (*As. Res.* XVII. 10,) distinguishes yeast-yielding *Bindhara* (*J. squamosa*) from the *Purpinja* or ground cypress, *J. communis*, there seems reason to believe from his statement, that the latter is the "most common shrub" in the Bhotiya pergunnas, that he practically reversed these two plants. Dr. Hoffmeister's specimens it is to be hoped, exist, and will decide the question so far as he is concerned.

tion of plants on Hindoo Koosh, where *Ephedra* appears to be common, reaching 10,000 feet (*Journals*, p. 485), as it is also along the snowy range of Kumaoon, not only in the Tibetan climate of Joohar (Milum), but also in the Indian or wet climate of Pindree, at 12,000 feet.

Juniperus squamosa appears to flower all the summer, from May to August, and the fruit to ripen from July to November, and probably later. Loudon describes it to be a decumbent, much branched shrub, with ascending branchlets: the leaves in threes closely imbricated, ovate-oblong, more or less acute (acutis acuminatisve, Don), inflexed at the apex as if obtuse, the withered ones persistent, with a very long point: and adhering to the branches like scales (hence the specific name). The berries vary from light blue to nearly black, (not *red* as Loudon has,) and are ovate-obtuse to ovate-oblong, very glossy, one-seeded, with three to four opposite scales about the centre, and two smaller ones near the top, which is umbilicate and furrowed. But in fact the leaves are scarcely a criterion, for on bushes from Milum and the Vishnoo Gunga glacier, which lived for many months at Almorah, those of the upper branches had imbricated cupressiform leaves, while on the lower branches they were (in whorls of threes) linear-lanceolate, acute, stiff, more or less spreading, either green on both sides, or very glaucous below. Usually, however, the shrub which I call *J. squamosa* has the leaves all cupressiform, except the withered persistent ones, which are invariably lanceolate and acuminate.

At Pindree (with the last); at the Soondurdhoonga glacier (the westernmost source of the three glacier springs of the Pindur); on the crags of Rikholee Goodree, the great spur of Trisool; on the Pilgwenta mountain, above Josheemuth; on Toongnath; on the ancient Moraine *below* Kedarnath; on the approach to the Shatool Pass,* and no doubt in many other places (Mr. Winterbottom

* There is a passage in Dr. Royle's Illustrations, p. 351, which requires elucidation. "The former (*Cupressus torulosa*? "bastard or creeping cedar"?) appears to be the plant called *Theloo* by the natives, and seen by Huree Singh between Simlah and Fagoo, near a small piece of water, and by Murdan Aly, a very intelligent plant collector, near Janghee-ke-Ghat, a

procured it from Gosainthan,) occurs a variety of the above, Lieutenant Strachey thinks a distinct species, with the same habit, except that, especially in drying, the innumerable branchlets are much curved down, while the leaves, of a peculiarly brilliant grass-green, very resinous and aromatic, are *all* linear-lanceolate, very acute, and spreading in threes: the decayed ones as in *J. squamosa.* This is, I suspect, Dr. Royle's species from Koonawur, marked with a doubt, *J. recurva:* p. 351. It is, like the last, called "*Bhedara,*" "*Jhora,*" "*Bil,*" in Kumaoon and Gurhwal; but does not seem to flourish in the Bhotiya pergunnas, but to affect the Indian face and climate of the Himalaya from 11,000 to 13,000 feet. Certainly it looks very different from the cupressiform variety: but my specimens from Choor seem to exhibit a medium, and the two forms combined on plants from Milum, Budureenath, and Sikhim, are inimical to the idea of their being really distinct. Caution becomes us in a genus notorious for variation, and in a kingdom of which the Rev. W. Herbert can record: "I mentioned long ago that I had raised at Mitcham, primrose, cowslip, oxlip, and dark *Polyanthus,* from the seed of one plant highly manured without any hybridization." The berries of these two junipers seemed to be identical. But the species can scarcely be elucidated by the *Hortus Siccus,* and, beyond all others, require careful study at all stages and in all localities. The present researches of Messrs. Thompson and R. Strachey, will probably remove some of our doubts as to this genus.

The *bulma* or yeast referred to at p. 96, is made from the cupressiform *J. squamosa, Bil* of Joohar, *Bhedara* (not *Bindhara*) of Neetee. It is used in distilling arrack from rice, and is prepared by moistening coarse barley-flour, which is made into a ball and covered all round with leaves and sprigs of juniper. The whole is then closely wrapped up in blankets, and kept in a warm place, where in three or four days the mass ferments.

high hill to the southward of Rol." Now, though the only plant near Simlah is *Cupressus torulosa,* Huree Singh assured me that by *Theloo* he meant the creeping juniper described in the text: and Murdan Aly equally assures me that the plant of Janghee Ghat was a juniper, which he describes as an *erect* shrub, 4 or 5 feet high, well known as *Theloo,* and I doubt not the very variety? of *J. squamosa,* which I found in the same district.

Juniperus communis (var *nana*, v. *alpina)*, No. 2, of p. 95, original paper. A very distinct species, which is thus named on the authority of Mr. Winterbottom, who is familiar with the European plant. Its easternmost known position is at 10,500 feet, on the Cheto Binaik, above Boodhi, at the south entrance to the Alpine Valley of Byans: where the Bhotiyas call it "*Lhálá.*" (Captain H. Strachey, Journey to Cho Lagan.) It next occurs in Joohar, at Milum and Tola, from 11,000 to 12,000 feet, less abundant than *J. squamosa:* the name here and at Neetee, is "*Cheechia.*" It was first discovered by Captain Webb, in the Dhoulee valley, on the approach to the Neetee Pass *(Bhotaniæ alpibus*, Don), where Messrs. Jameson and R. Strachey have more recently observed it near Bumpa and on the mountains behind Mularee, at about 10,500 feet; Lieutenant Strachey assures me that it even descends to 9,000 feet at Jelum, and accompanies *J. squamosa* to Rimkim, in the heart of the snowy range beyond Neetee, to 14,000 feet or more. On the glacier-moraines of the Vishnoo-gunga, west of Mana, I found it in abundance from 12,000 to 13,000 feet; known to the Bhotiyas of Mana as "*Churpunja,*" and to those of Neetee as *Par-pinja:* and, therefore, the "creeping cypress" of Mr. Traill. But in fact, I believe this to be his juniper, and *J. squamosa* his creeping cypress: the aspect of each shrub much better answering to these popular names. From Mana westward we lose sight of the shrub till we reach Koonawur, where there can be little doubt it is Dr. Hoffmeister's "bushes of thorny blueish-green juniper" at Jungra, a *Chalet* on the south face of the Wyrung Pass, probably from 11,500 to 12,000 feet above the sea: (p. 299,) where, as well as on the Roonung Pass, it was observed by Captain Hutton, the name *Thiloo* being used, probably from *J. squamosa* being called *Pama* (*J. A. S.* Nov. 1839, pp. 929, 930). Beyond this I do not know that it has been traced. As a Siberian plant, it is remarkable for being about the lowest in site of the Himalayan junipers, the range being from 9,000 to 14,000 feet, or 14,500 if it be Captain A. Gerard's "*Bettir.*" I think it probable, too, that this is Dr. Royle's *Juniperus religiosa*, a supposed new species from Koonawur, of which, unfortunately, he gives no character or locality, merely the name "*Googgul,*" a

general one for *incense,* as which, he tells us (p 351), the people burn it in their religious ceremonies: so Captain Hutton marks his *Thiloo,* which I take to be *J. communis,* "a species of cedar used as incense."

J. communis, var *nana,* has a more bushy and not so wide-spreading habit as *J. squamosa,* with which it is sometimes intermingled, but is apparently unknown on the Indian declivity of the Himalaya. It is readily distinguished by the pale, yellowish-green tint of the foliage: leaves in whorls of three, half-spreading, linear, very acute and pungent, about a third of an inch long, convex below, concave and very glaucous above; the fruit and twigs exuding an exceedingly rank turpentine or resin (Captain H. Strachey). Yet in Joohar, they are not used for incense: of that district, however, the Bhotiyas are somewhat careless in such matters, and look sharply to this world and things substantial rather than spiritual.

The fruit ripens August, November: berries large, round, dark blue, covered with glaucous bloom: extremely resinous and aromatic. On the apex are three diverging furrows, connected at the extremities by an elevated scale, and thus forming a kind of platform on the top of the berry. Lower down are three large lateral scales. Seeds always three, oblong, angular. Under favorable circumstances, Loudon states that *J. communis* attains the height of thirty feet in England; on the sides of hills its trunk grows long or procumbent; but on the tops of rocky mountains and in bogs it is a tufted shrub: and thus I suppose Dr. Hooker to include *J. excelsa* and *squamosa* under one description. He assures me that the Himalayan form of *J. communis* is not present in any part of Sikhim.

4. *Juniperus recurva.* The *Arboretum Britannicum* and Don's *Prodromus* furnish the following description; a bush or low tree, graceful from its pendulous habit, and readily distinguished from all the other species, not only by this circumstance, but by the mixture of its brown, half decayed chaffy leaves of the past year, with the greenish-grey of the present: (elsewhere I think Loudon calls them "intense green.") Branches and branchlets recurved, pendulous; bark rough, brown, curling up and scaling off. Leaves linear-lanceolate, mucronate, loosely imbricated, smooth, convex

beneath. Berries roundish-oval, tuberculate. Don says it flowers in February, and on Hamilton's authority gives Narainhetty as the habitat, where it has doubtless been introduced, as a sacred plant, from Gosainthan, the locality assigned by Dr. Royle. It is probably the shrub of Bhotan mentioned by Dr. Griffith at 10,000 feet, "a small but elegant tree," mixed with *Abies densa (Webbiana)*: and "the weeping juniper (which) grows in the damper woods" of northern Sikhim, as described to me by Dr. Hooker. Mr. Winterbottom, who has seen specimens in Nepal, is of opinion, that this species or variety is not in Kumaoon, nor have I ever observed such in any portion of British Himalaya, where I think none of the junipers grow in forests, but on the sloping downs above them. Nevertheless the lax-leaved variety from Soondurdhoonga, &c. of *J. squamosa,* though a reclining and not an erect bush, comes pretty near the description of *J. recurva*: but Dr. Hooker, as we have seen, considers the erect one a mere variety. His "*Desheu*" with pendulous branches, mentioned above, and I suppose also his "weeping juniper," may be this species.

X. Taxus baccata.—Dr. Griffith found *Taxus* common in several parts of Bhotan, flourishing best apparently between 8,000 and 9,000 feet: the loftiest habitat mentioned (p. 257) is 9,800 feet: the lowest, near Rydung, *below* 7,100, p. 276, 277: which is nearly its lower limit in Kumaoon and SE. Gurhwal. In the former it occurs on the Puya Panee Range, near Devee Dhoora, at 6,500: and at Bala Jagesur temple (probably planted) at 5,900: at Ludoolee Ghat, on the Nyar, in Gurhwal, at 7,000. In Sikhim, Dr. Hooker informs me that it does not descend below 9,000: being very rare on the inner ranges, and unknown on the rearward. In Busehur, &c. I do not recollect it below 8,000. Dr. Hoffmeister, in allusion to the last districts chiefly, gives the limits 5,000 to 8,000 feet, both doubtless far from the truth. He seems occasionally to have mistaken *Picea Pindrow* for this tree; thus, the small forest near Fagoo (p. 505,) is the former, though one or two trees of *Taxus* are found above, on Muhasoo, which I suspect he never saw. Thus, also, at p. 313, he says that between Goureekoond and Kedarnath, the yew "shoots up and stands forth a full grown tree amongst the stunted bushes" at the limit of forest, there about

11,000 feet; a form of expression unsuited to this tree, which (p. 505,) he justly observes is "dwarfish on the heights": indeed at p. 496, the Kedarnath tree is expressly called *Pindrow.* For the same reason, when, descending the NE. side of Dhunpoor (p. 306), he says "*Taxus* (yew) of tall and noble stems, especially predominates," I suspect the *Pindrow* is equally intended: it may occur there with the yew, but (p. 495,) was first met or first recognized much further on, at the Kaleekhal, one of the spurs of Toongnath.*

I am without memorandum or materials for the upper limit of *Taxus,* but from recollection should say it reaches to 10,500 feet, perhaps higher, for in Sikhim, Dr. Hooker found it in perfection at 10,000: it is there called *Tingshi.* The general name amongst the Khusiyas and Kunaits of the British Himalaya is "*Thoona*" or "*Thooner;*" and it is observable, that all along the line of alpine villages, the names of the chief trees are nearly identical from Kumaoon to Busehur: whence may be inferred identity of race. This is by no means true of the *much fairer* population of the midland and plainward districts, were blood and language have evidently been much mixed. Thus on the Thakil mountain in Shor, the yew is called "*Looet,*" which is also the

* The criticism in the text, founded solely on analogy and recollection of other localities, is borne out by experience. During the present autumn (1849,) I have visited Dhunpoor and Kedarnath. The only yews near the former place are three spreading and remarkably bushy trees, evidently preserved. The "*Taxus* of tall and noble stems on the mountain heights" is *Picea Pindrow,* which, ESE. of the village, forms a large wood round the temple of Huriyalee Devee. So on the approach to Kedarnath we have poor scrubby *Taxus* nearly to the limit of forest at 11,200 feet, nor is the tree common or at all fine on any part of the route up. What Dr. H. took for it is *Picea Webbiana,* of which the few specimens near the road have the form he mentions.

With regard to the greatest elevation at which the yew is found, I have little to add to the text. On Toongnath it ascends to 11,000 feet: at Kedarnath to 11,200: on the south face of the Pilgwenta Pass, it reaches within 200 feet of the uppermost *Picea Webbiana,* but on the northern not within 600. We shall not be far out, therefore, in fixing 11,500 as the upper limit: at which, by the way, *Picea Pindrow* is quite unknown in Kumaoon and Gurhwal.

appellation amongst the Bhotiyas of Joohar, while those of Byans call it "*Nhare.*" In Bulsun, Joobul, &c. it is known as "*Gelee,*" "*Gulla,*" the last also denoting the *Pindrow* fir; a proof of the often mentioned resemblance of the two, and which, if plants were named naturally, would cause this to rank as *Picea taxifolia.* Hence too, at Fagoo, near Simlah, the *Pindrow* is called "*Thoonera.*" In Koonawur the yew is known as *Rikalung* (*Rikar* of Chumba and Koolloo), "*Ikalung,*" "*Yumdul,*" and very commonly "*Sung-cha.*"

The yew may be considered a common tree in the British Himalaya, especially between 8,000 and 10,000 feet; it forms a beautiful forest between Puthurnula and Kugna on the route from Simlah to Choor; the largest tree measured was only 15 feet in girth at the height of 4; and Dr. Hoffmeister (p. 325) notes one of this size on the Pass, SE. of Reithal near Gungotree, as if the largest he had seen: but doubtless much larger samples might be found, rivalling in dimensions those of Europe. Dr. Hooker found one 18 feet on Tonglo, in Sikhim, at 10,000 feet. With very rare exceptions the yew is diœcious; in the Himalaya it flowers in April and May; the fruit ripens during September, October and November; and is freely eaten with perfect impunity, by the mountaineers. Dr. Lindley, indeed, says (*Vegetable Kingdom*) that the berries are not dangerous, but that the leaves are fetid and very poisonous, especially to horses and cows. "Rex Cativolus Taxo cujus magna in Gallia Germaniæque copia est, se exanimavit" (*Cæsar*). The Italians still call the yew *Albero della morte,* either from its poisonous leaves, its position by grave-yards, or its aspect, which Pliny calls "gracilisque, et tristis, ac dira." He states it to be so deleterious in *Arcadia* (miracula fugiunt) that "qui obdormiant sub ea, cibumque capiant, moriantur. Sunt qui et taxica hinc adpellata dicant venena, quæ nunc toxica dicimus, quibus sagittæ tingantur. Repertum innoxiam fieri, si in ipsam arborem clavus æreus adigatur;" (XVI. 20); perhaps by some mesmeric "rapport" of the nature of the galvanic ring and other quackeries in vogue amongst ourselves. Some derive *Taxus* from *taxis,* arrangement, in reference to the two-ranked disposition of the leaves. Our English name seems merely a variation of the

German *Eibe*, by the common transmutation of *b* into *w* or *v*: the Gaelic *Iubhar*, *Iuthar*, seem cognate terms, of which the etymology is unknown to me.

Taxus nucifera (p. 103) is the *Podocarpus nucifer* of Persoon, *Taxodium nuciferum* of Brongniart. The Arboretum Britannicum describes the leaves "2-ranked, distant, lanceolate, pointed, and but half the length of the fruit; the foliage and habit of the plant strongly resemble those of a deciduous cypress. Frequent, according to Kœmpfer, in the northern provinces of Japan, where it forms a lofty tree, with many opposite, scaly branches: found also on mountains in Nepal and Kumaoon. Dr. Royle apparently* ex-

* I say *apparently*, for though Dr. Royle, (p. 353,) says generally that yew leaves "are brought down from the hills, the produce both of *T. baccata* and *T. nucifera*, called *thoono* and *tooner*" (mere provincial variations of *T. baccata* I believe): yet in p. 351, the proper antecedent to *these*, in "these are found in Nepal, Kumaoon," &c. may be, not *Taxus baccata* and *nucifera*, but, species of yew, juniper, and cypress," p. 350, a misapprehension which has cost me some useless search. The "stunted yews" met by Dr. Richardson in the pine forests of the mountains between Moulmein and northern Siam were probably *Taxus nucifera.*—*J. A. S.*, October 1836, p. 621.

At p. 57, of the Tentamen Floræ Nepalensis, Dr. Wallich states that *Taxus nucifera* was gathered on the "montes Tibetanæ" by W. S. Webb, and in Sireenuggur or Gurhwal, by Kamroop and P. Blinkworth. Dr. Wallich's figure (tab. 44) differs so widely from that of Kœmpfer, that we can scarcely suppose the plants represented to be identical: and as Dr. Wallich never saw the mature fruit of his plant, with leaves so closely resembling those of *Taxus baccata*, it is very possible that his figure may actually represent that species. The Newar name "*Loosoah*," comes very near the Bhotiya "*Looet*" of Joohar, (*Soah* being merely plant or tree) applied, as before noted, to *Taxus baccata*. The berry-bearing *Tooner* sent to Dr. Wallich (p. 58) from the confines of Tartary by Captain Webb, would seem from the name to be merely the usual yew of the Himalaya. If Dr. Wallich's yew be really *T. nucifera*, it will be found on Sheopoor, in Nepal, at about 10,000 feet elevation.

[But Zuccarini (Morphology of the *Coniferæ*, p. 53,) shews from the original specimens, that Dr. Wallich's tree is certainly *not Taxus nucifera*, but one closely allied to *T. baccata*, and named by him *T. Wallichiana*: in all probability, the usual form of Himalayan yew, hitherto considered, to be *T. baccata*: vide Dr. Z.'s plate V. We are therefore without any proof of the existence of *T. nucifera* in the Himalaya, except the general expressions of Dr. Royle, which probably rest on the authority of Dr. Wallich.]

tends its habitat to Choor and Kedarkanta, in Sirmour and Gurhwal: but during two visits to the former mountain, and a tolerably extended and assiduous examination of Kumaoon and SE. Gurhwal, from the plains to the Himalaya, by Lt. Strachey and myself, we have failed to detect it; but it may exist on the eastern frontier along the Kalee, where the flora is doubtless somewhat nearer that of Nepal than the better known districts more west. On the lower Kalee too, if at all, would be found the Nepal, Japan, Singapoor and Penang plant, *Podocarpus macrophylla.*

The people of Ludakh import from Kashmeer yew-bark, not only for tea, but also as yielding a red dye, which may possibly be used in coloring shawls: this I was told by Kashmerians at Simlah. Dr. Hooker informs me, that "the red juice of the bark is used as a very bad dye, and for marking the foreheads of the brahman Gorkhas in Nepal." This dye is probably one of the objects with which the leaves and twigs are imported to Hindoostan from Choor, Shallee, &c.; on both of these mountains the article so collected is called *Birmee,* or perhaps *Birhmee,* apparently the Sanscrit *Bruhmee, Siphonanthus Indica,* Wilson, but *Hydrocotyle Nepalensis* in Kumaoon. The collectors told me that the *Birmee* produced only 12 to 24 annas per maund, which, however, would not remunerate them for the time and labor expended in gathering and conveying it to market: and is either a falsehood, or a proof that the article is of no great value or estimation.

But considering the poisonous nature of the leaves, the most remarkable application of yew-bark is in the preparation of tea, as referred to at p. 99, of my original paper; for I fully ascertained in Koonawur, 1845, that *Sung-cha* is the yew yielding the tea-bark exported thence to Ludakh under the name of *Chatoong.*

Captain J. D. Cunningham (*J. A. S.* 1844, p. 217, No. 147,) says, "I understand that the Bisehur tea was produced chiefly about Lippa, that of Jukhul (or Jughul, between Rampoor and Seran, where the yew seems to be called *Hurkaho,* M.), being a greenish variety. The tea or bush is called *Pungcha.* The leaves are exposed in the sun for two days: they are then mixed with a gum called *Changta* or *Jatta,* which oozes from a tree called *Trin,* found near Lippa: this, it is said, is done to give it a color. The

bark of a tree called *Sungcha* (found about Rampoor) is used instead of cinnamon." Moorcroft's account of the "green tea" corroborates this as to the place of production: viz. in the lower province of Busehur. He was told (I. 352) that the bush is an evergreen, and that the leaves and small branches are the parts used: but "if the first infusion were used, it would heat the body, and occasion pains in the limbs." All according well with the yew. He goes on to say, that the black tea is produced from the leaves of a *deciduous* shrub near Usrung and Leepee. *Pung-cha* seems merely to denote "tea-tree," and I was assured that no other bark is used as the basis of the tea than that of the *Sungcha;* but every endeavour, though aided by the influence of the Hon'ble Mr. Erskine, to procure the *Pungcha* from Lippa failed: by no means a singular instance of the difficulties, which, from the ignorance, apathy and carelessness of the natives, beset such "Asiatic researches." What came from Seran as specimens of "*Trin*" turned out to be *Rhus kankarsingi;* and I also learned that *Trin* does not grow at Lippa, but much lower down between Pungee and Akpa, a climate more suited to *Rhus.* The name Cha-*toong* suggests *Rhus velutina:* both are *deciduous.* Captain Holmes was told that in the rainy season the sap of the *Trin* exudes spontaneously and becomes thickened into a gummy mass, *(Kankarsingi?)* which is collected and drank in a decoction of tea: the leaves also are steeped in water for a tanning infusion. "*Zangcha,*" in Ludakh, is the name of an inferior kind of *black* tea (Captain H. Strachey).

Yew branches are still carried in processions on Palm Sunday in Ireland, the evergreen distichous leaves being the nearest approach admitted by the climate to the authentic palm, *Phœnix dactylifera.* The tree is still called palm in Kent and other parts of England, where, as well as in Scotland, the same practice prevailed before the Reformation: but the willow, *Salix caprea,* generally usurped the title: its leaf is *somewhat* nearer *Chamærops,* the palm selected in the south of Europe. It is (as I learn from himself) in the sense of *Salix* that we are to understand a passage in Captain Weller's journey to the Oonta Dhoora Pass, *J. A. S.* No. 134 of 1843, p. 91, where, towards Luftel, he

came on "some low hillocks most pleasantly covered with stunted palm trees in flower." The species intended is not unlike *S. caprea,* and as a low bush, was seen by Messrs. Strachey and Winterbottom in the same district at an elevation of 15,500 feet, where it would be a miracle to find a true palm.

I have seen the people in Kumaoon carrying yew branches in their religious processions; they justly considered it as holy as the *Deodar,* and, in fact, called it by that name. We need not therefore, expect, any of the classical and somewhat conventional horror of the tree. Sir H. Ellis, in *Brand's Popular Antiquities,* says, it was called by Shakespeare "the *double* fatal yew," because the leaves are poisonous, and the wood employed in instruments of death. He also quotes Virgil as denouncing "the baneful yew," and Statius "metuendaque succo Taxus." He further shews, that the notion of the yew being planted in Church-yards for the supply of bow-staves is fallacious, as they were never sufficiently numerous, while the wild trees were abundant; and because Spanish yew was always used. The most plausible conjecture is, that it was planted by the Church to furnish *palms* for Palm Sunday; the enclosed grave-yard being chosen, as the cattle were thereby prevented from browsing on the leaves. The "tree of death" was thus converted into the emblem of Victory and Immortality.

Tabular View of Experiments on the transverse strength of Himalayan Pine Timber, made at Fort Moira, Almorah, in October 1844, by Captain W. Jones, Bengal Engineers.

Number of Experiment.	Name of Tree.	Distance between supports.	Depth.	Breadth.	Specific gravity.	Weight producing deflection of	Breaking Weight.	REMARKS.
						⅛ Inch.		
1	Cedrus Deodara, seasoned.	4 feet	2 Ins.	2 Ins.	.608	1036 lbs.	1588	Good straight grained wood.
2		„ „	„ „	„ „	.710	1024	1636	Lower side split a little at 1060.
3		„ „	„ „	„ „	.698	736	880	Not straight grained, and slightly flawed.
4		„ „	„ „	„ „	.669	1060	1540	Lower side split at 1308.
5		„ „	„ „	„ „	.620	904	1456	„ „ „ „ 904.
1	Cedrus Deodara, cut Septr. 1844.	„ „	„ „	„ „	.585	680	976	Broke suddenly.
2		„ „	„ „	„ „	.574	680	708	„ „
3		„ „	„ „	„ „	.614	344	„	„ „ no flaw perceptible.
4		„ „	„ „	„ „	.586	568	1204	„ „
5		„ „	„ „	„ „	.604	624	„	Lower side went at 624 : uneven grained.
1	Pinus longifolia, cut Septr. 1844.	„ „	„ „	„ „	.545	540	1000	Broke at a knot.
2		„ „	„ „	„ „	.570	624	1144	Red colored and rather knotty.
3		„ „	„ „	„ „	.552	568	940	Large coarse grained.
4		„ „	„ „	„ „	.596	1112	1372	
5		„ „	„ „	„ „	.596	1000	1444	
1	Pinus longifolia, cut Septr. 1844.	„ „	„ „	„ „	.670	1036	1420	
2		„ „	„ „	„ „	.634	820	1132	
3		„ „	„ „	„ „	.673	940	1288	
4		„ „	„ „	„ „	.710	1036	1540	
5		„ „	„ „	„ „	.600	764	1304	Apparently the best piece of the 5, though all were very good.
						½ inch. 2 inches		
1	Picea Webbiana ? Raisulla, cut Septr. 1844.	„ „	„ „	„ „	.472	680 „	940	Broke at a knot, 1 foot from the centre.
2		„ „	„ „	„ „	.559	512 „	880	Broke suddenly, no flaws perceptible : deflection ⅞ths.
3		„ „	„ „	„ „	.546	820 „	1206	
4		„ „	„ „	„ „	.518	820 „	1084	
5		„ „	„ „	„ „	.560	736 „	904	

Number of Experiment.	Name of Tree.	Distance between supports.	Depth.	Breadth.	Specific gravity.	Weight producing deflection of 1 inch.	Weight producing deflection of 2 inches	Breaking Weight.	REMARKS.
1	Pinus longifolia, cut Septr. 1844.	8 feet	2½ ins.	3 ins.	.665	412	792	1168	Coarse grain.
2		„ „	„ „	„ „	.726	680	1324	1768	Quite free from knots.
3		„ „	„ „	„ „	.707	636	1288	1744	A few small knots.
4		„ „	„ „	„ „	.615	484	976	1756	No knots.
5		„ „	„ „	„ „	.625	568	1132	1420	Good wood, but broke at a small knot.
1	Pinus longifolia, seasoned.	„ „	„ „	„ „	.591	456	844	1168	
2		„ „	„ „	„ „	.585	400	764	1208	
3		„ „	„ „	„ „	.575	490	1036	1648	Very evenly and fine grained.
4		„ „	„ „	„ „	.601	344	680	1168	
5		„ „	„ „	„ „	.662	484	904	1300	
1	Cedrus Deodara, cut Septr. 1844.	„ „	„ „	„ „	.641	350	764	820	Snapped suddenly: light colored, said to be outside of tree
2		„ „	„ „	„ „	.618	400	788	1028	Heart of tree; red and oleaginous.
3		„ „	„ „	„ „	.644	344	660	908	Snapped short suddenly; light colored.
4		„ „	„ „	„ „	.579	428	876	1116	Heart of tree; very good and red.
5		„ „	„ „	„ „	.578	344	736	964	Snapped suddenly, but was in appearance the best piece of all five.
1	Cedrus Deodara, seasoned.	„ „	„ „	„ „	.566	344	680	750	Good sound wood; but knotty, coarse and wavy in grain. Snapped suddenly at knot.
2		„ „	„ „	„ „	.629	344	576	624	
3		„ „	„ „	„ „	.619	512	960	1188	Dark cedar colored: fine grained: broke at a knot.
4		„ „	„ „	„ „	.630	598	1080	1700	„ „ „ under-side very fine, straight grained, and light colored.
5		„ „	„ „	„ „	.603	484	876	1092	„ „ „ but rather coarse in grain.
1	Picea Webbiana? Raisulla, cut Septr. 1844.	„ „	„ „	„ „	.436	344	652	780	Broke gradually; all very moist and soft.
2		„ „	„ „	„ „	.481	514	944	1064	
3		„ „	„ „	„ „	.434	372	740	788	Broke at a knot.
4		„ „	„ „	„ „	.458	456	848	930	
5		„ „	„ „	„ „	.483	400	764	968	

N. B.—From what Mr. Batten tells me, I am induced to believe that the *Picea Webbiana* or *Raisulla* of the above tables was in fact the *Picea Pindrow* or *Ragha* of Kumaoon.

Uses of the Stillingia sebifera or Tallow Tree, with a notice of the Pe-la or Insect-wax of China. By D. J. MACGOWAN, M. D., *Corresponding Member of the Agricultural and Horticultural Society of India.*

The botanical characters of this member of the *Euphorbiaceæ* are too well known to require description, but hitherto no accurate account has been published of its varied uses, and although it has become a common tree in some parts of India and America, its value is appreciated only in China, where alone its products are properly elaborated.

In the American Encyclopædia it is stated, that this tree is almost naturalized in the maritime parts of South Carolina, and that its capsules and seeds are crushed together and boiled, the fatty matter being skimmed as it rises, hardening when cool.

Dr. Roxburgh in his excellent *Flora Indica* says: "It is now very common about Calcutta, where, in the course of a few years, it has become one of the most common trees. It is in flower and fruit most part of the year. In Bengal it is only considered an ornamental tree, the sebaceous produce of its seeds is not in sufficient quantity, nor its qualities so valuable as to render it an object worthy of cultivation. It is only in very cold weather that this substance becomes firm, at all other times it is in a thick, brownish, fluid state, and soon becomes rancid. Such is my opinion of the famous vegetable tallow of China."

Dr. Roxburgh was evidently misled in his experiments by pursuing a course similar to that which is described in the Encyclopædia Americana (and in many other works), or he would have formed a very different opinion of this curious material. Analytical chemistry shows animal tallow to consist of two proximate principles—*stearine* and *elaine*,—now, what renders the fruit of this tree peculiarly interesting is the fact that both these principles exist in it separately, in nearly a pure

state. By the above named process stearine and elaine are obtained in a *mixed* state, and consequently present the appearance described by Roxburgh. •

Nor is the tree prized merely for the stearine and elaine it yields, though these products constitute its chief value; its leaves are employed as a black dye, its wood being hard and durable, may be easily used for printing blocks and various other articles, and finally, the refuse of the nut is employed as fuel and manure.

The *Stillingia sebifera* is chiefly cultivated in the provinces of Kiangsí, Kongnain and Chehkiang. In some districts near Hangchan, the inhabitants defray all their taxes with its produce. It grows alike on low alluvial plains and on granite hills, on the rich mould at the margin of canals, and on the sandy sea-beach. The sandy estuary of Hangchan yields little else. Some of the trees at this place are known to be several hundred years old, and though prostrated, still send forth branches and bear fruit. Some are made to fall over rivulets, forming convenient bridges. They are seldom planted where any thing else can be conveniently cultivated,—in detached places, in corners about houses, roads, canals and fields. Grafting is performed at the close of March or early in April, when the trees are about three inches in diameter, and also when they attain their growth. The *Fragrant Herbal* recommends for trial the practice of an old gardener, who, instead of grafting, preferred breaking the small branches and twigs, taking care not to tear or wound the bark.

In mid winter when the nuts are ripe, they are cut off with their twigs by a sharp crescentric knife, attached to the extremity of a long pole, which is held in the hand and pushed upwards against the twigs, removing at the same time such as are fruitless. The capsules are gently pounded in a mortar to loosen the seeds from their shells, from which they are separated by sifting. To facilitate the separation of the white sebaceous matter enveloping the seeds, they are

steamed in tubs, having convex open wicker bottoms, placed over cauldrons of boiling water. When thoroughly heated, they are reduced to a mash in the mortar, and thence transferred to bamboo sieves, kept at an uniform temperature over hot ashes. A single operation does not suffice to deprive them of all their tallow, the steaming and sifting is therefore repeated. The article thus procured becomes a solid mass on falling through the sieve, and to purify it, it is melted and formed into cakes for the press; these receive their form from bamboo hoops, a foot in diameter and three inches deep, which are laid on the ground over a little straw. On being filled with the hot liquid, the ends of the straw beneath are drawn up and spread over the top, and when of sufficient consistence, are placed with their rings in the press. This apparatus, which is of the rudest description, is constructed of two large beams placed horizontally so as to form a trough capable of containing about fifty of the rings with their sebaceous cakes; at one end it is closed, and at the other adapted for receiving wedges, which are successively driven into it by ponderous sledge-hammers wielded by athletic men. The tallow oozes in a melted state into a receptacle below where it cools. It is again melted and poured into tubs, smeared with mud, to prevent its adhering. It is now marketable, in masses of about eighty pounds each, hard, brittle, white, opaque, tasteless, and without the odour of animal tallow: under high pressure it scarcely stains bibulous paper; melts at 104^{0} fah. It may be regarded as nearly pure stearine, the slight difference is doubtless owing to the admixture of oil expressed from the seed in the process just described. The seeds yield about eight per cent. of tallow, which sells for about five cents per pound.

The process for pressing the oil, which is carried on at the same time, remains to be noticed; it is contained in the *kernel* of the nut, the sebaceous matter, which lies *between* the *shell* and the *husk*, having been removed in the manner described.

The kernel and the husk covering it, is ground between two stones, which are heated to prevent clogging from the sebaceous matter still adhering. The mass is then placed in a winnowing machine, precisely like those in use in Western countries. The chaff being separated, exposes the white oleaginous kernels, which, after being steamed, is placed in a mill to be mashed. This machine is formed of a circular stone-groove, twelve feet in diameter, three inches deep, and about as many wide, into which a thick solid stone-wheel, eight feet in diameter, tapering at the edge, is made to revolve perpendicularly by an ox harnassed to the outer end of its axle, the inner turning on a pivot in the centre of the machine. Under this ponderous weight, the seeds are reduced to a mealy state, steamed in the tubs, formed into cakes, and pressed by wedges in the manner above described: the process of mashing, steaming, and pressing being repeated with the kernels likewise.

The kernels yield about thirty per cent. of oil. It is called *Ising-yu*, sells for about three cents per pound, answers well for lamps, though inferior for this purpose to some other vegetable oils in use. It is also employed for various purposes in the arts, and has a place in the Chinese Pharmacopœia, because of its quality of changing grey hair black, and other imaginary virtues. The husk which envelopes the kernel, and the shell which encloses them and their sebaceous covering are used to feed the furances; scarcely any other fuel being needed for this purpose. The residuary tallow-cakes are also employed for fuel, as a small quantity of it remains ignited a whole day. It is in great demand for chafing dishes during the cold season, and finally, the cakes which remain after the oil has been pressed out are much valued as a manure, particularly for tobacco fields, the soil, of which is rapidly impoverished by the Virginian weed.

Artificial illumination in China is generally procured by vegetable oils, but candles are also employed by those who

can afford it, and for lanterns. In religious ceremonies no other material is used. As no one ventures out after dark without a lantern, and as the gods cannot be acceptably worshipped without candles, the quantity consumed is very great. With an unimportant exception, the candles are always made of what I beg to designate as vegetable stearine.

When the candles, which are made of dipping, are of the required diameter, they receive a final dip into a mixture of the same material and insect-wax, by which their consistency is preserved in the hottest weather. They are generally colored red, which is done by throwing a minute quantity of alkanet root *(Anchusa tinctoria,* brought from Shangtung) into the mixture. Verdigris is sometimes employed to dye them green. The wicks are made of rush coiled round a stem of coarse grass, the lower part of which is slit to receive the *pim* of the candlestick, which is more economical than if put into a socket. Tested in the mode recommended by Count Rumford, these candles compare favorably with those made from spermaceti, but not when the clumsy wick of the Chinese is employed. Stearine candles cost about eight cents the pound.

Prior to the thirteenth century, bees' wax was employed as a coating for candles, but about that period the white wax-insect was discovered, since which time that article has been wholly superseded by the more costly but incomparably superior product of this insect. It has been described by the Abbé Grossier, Sir George Staunton and others, but those accounts differ so widely amongst themselves, as well as from that given by native authors, as to render further inquiry desirable. From the description given by Grossier, Entomologists have supposed the insect which yields the *Pe-la,* or white wax, to be a species of *Coccus.* Staunton, on the contrary, describes it as a species of *Cicada (Flata limbata).* As described by Chinese writers, however, it is evidently an *apterous* insect, hence the inference either that there are two distinct species which pro-

duce white wax, or that the insect Staunton saw was falsely represented as the elaborator of this beautiful material.*

This, like many other interesting questions in the Natural History of this portion of the globe, must remain unsolved until restrictions on foreign intercourse are greatly relaxed, or wholly removed. In the mean time, native writers may be consulted with advantage. It is from the chief of these, the Puntsau and the Kiangfangpu, two herbals of high authority, the subjoined account has been principally derived.

The animal feeds on an evergreen shrub or tree, *Ligustrum lucidum*,† which is found throughout Central China, from the Pacific to Thibet, but the insect chiefly abounds in the province of Sy'chuen. It is met with also in Bunan, Hunan and Hupeh. A small quantity is produced in Kinhwa, Chehkiang province, of a superior description. Much attention is paid to the cultivation of this tree: extensive districts of country are covered with it, and it forms an important branch of agricultural industry. In planting, they are arranged like the mulberry in rows about twelve feet apart, both seeds and cuttings are employed. If the former, they are soaked in water in which unhusked rice has been washed, and their shells pounded off. When propagated by cuttings, branches an inch in diameter are recommended as the most suitable size. The ground is ploughed semi-annually, and kept perfectly free

* A few particulars regarding the Himalayah wax-insect (*Flata limbata*), by Capt. Hutton, are published in the Journal of the Asiatic Society of Bengal, Vol. xii. After alluding to Sir Geo. Staunton's and the Abbé Grossier's account of the wax-yielding insect of China, and to various authorities, Capt. Hutton observes ;—"From all these statements, therefore, we arrive at the positive conclusion, that as this deposit [the deposit of *F. limbata*] will neither melt on the fire *per se*, nor combine with oil, it cannot be the substance from which the famous white wax of China is formed ; and we are led to perceive from the difference in the habits of the larva of *Flata limbata*, and that of the insect mentioned by the Abbé Grossier, that the wax is rather the produce of a species of *Coccus* than of the larva of *F. limbata*, or even of the allied *F. nigricornis*."—Eds.

† The Himalayah insect is not confined to a *Ligustrum*.—Eds.

from weeds. In the third or fourth year they are stocked with the insect. After the wax or insect has been gathered from the young trees, they are cut down, just below the lower branches, about four feet from the ground, and well manured. The branches which sprout the following season are thinned and made to grow in nearly a perpendicular direction. The process of cutting the trunk within a short distance of the ground, is repeated every four or five years, and as a general rule, they are not stocked until the second year after this operation. Sometimes the husbandman finds a tree, which the insects themselves have attained, but the usual practice is to stock them, which is effected in spring with the nests of the insect. These are about the size of a "fowl's head," and are removed by cutting off a portion of the branch to which they are attached, leaving an inch each side of the nest. The sticks with the adhering nests are soaked in unhusked-rice water for a quarter of an hour, when they may be separated. When the weather is damp or cool, they may be preserved in jars for a week, but if warm they are to be tied to the branches of the trees to be stocked without delay, being first folded between leaves. By some the nests are probed out of their seat in the bark of the tree, without removing the branches. At this period they are particularly exposed to the attacks of birds, and require watching.

In a few days after being tied to the tree, the nests swell, and innumerable white insects, the size of "nits," emerge, and spread themselves on the branches of the tree, but soon with one accord descend towards the ground, where, if they find any grass, they take up their quarters. To prevent this the ground beneath is kept quite bare, care being taken also that their implacable enemies, the ants, have no access to the tree. Finding no congenial resting place below, they re-ascend, and fix themselves to the lower surface of the leaves, where they remain several days, when they repair to the branches, perforating the bark to feed on the fluid within.

From "nits" they attain the size of "*Pediculus homi.*" Having compared it to this the most familiar to them of all insects, our authors deem further description superfluous. Early in June the insects give to the trees the appearance of being covered with hoar frost, being "*changed into wax,*" soon after this they are scraped off, being previously sprinkled with water. If the gathering be deferred till August, they adhere too firmly to be easily removed. Those which are suffered to remain to stock trees the ensuing season, secrete a purplish envelope about the end of August, which at first is no larger than a grain of rice, but as incubation proceeds, it expands and becomes as large as a fowl's head, which is in spring, when the nests are transferred to other trees, one or more to each, according to their size and vigor, in the manner already described.

On being scraped from the trees the crude material is freed from its impurities, probably the skeleton of the insect, by spreading it on a strainer, covering a cylindrical vessel, which is placed in a cauldron of boiling water, the wax is received into the former vessel, and on congealing is ready for market.

The *Pe-la* or white wax, in its chemical properties, is analogous to purified bees' wax, and also spermaceti, but differing from both, being, in my opinion, an article perfectly SUI GENERIS. It is perfectly white, translucent, shining, not unctuous to the touch, inodorous, insipid, crumbles into a dry inadhesive powder between the teeth, with a fibrous texture, resembling fibrous felspar: melts at 100° fah.; insoluble in water, dissolves in essential oil, and is scarcely affected by boiling alcohol, the acids or alkalies.

The aid of analytical chemistry is needed for the proper elucidation of this most beautiful material.* There can be no

* Some interesting particulars on this subject are contained in a Memoir in the Philosophical Transactions for 1848, by Mr. B. C. Brodie, entitled "on the Chemical nature of a Wax from China." Mr. Brodie states, that although in appearance the substance resembles stearine or spermaceti more

doubt, it would prove altogether superior in the arts to purified bees' wax. On extraordinary occasions, the Chinese employ it for candles and tapers. It has been supposed to be identical with the white wax of Madras, but as the Indian article has been found useless in the manufacture of candles, (Dr. Pearson, Philosophical Transactions, vol. 21) it cannot be the same. It far excels also the vegetable wax of the United States *(Myrica cerifera)*.

Is this substance a secretion? There are Chinese who regard it as such: some representing it to be the *saliva*, and others the excrement of the insect. European writers take nearly the same view, but the best authorities expressly say that this opinion is incorrect, and that the animal is changed into wax. I am inclined to believe the insect undergoes what may be styled aceraceous degeneration, its whole body being permeated by the peculiar product in the same manner as the *Coccus cacti* is by *carmine*.

It costs at Ningpo from 22 to 35 cents per pound. The annual product of this humble creature in China cannot be far from 400,000 pounds, worth more than Sp. Drs. 1,00,000.

NINGPO: *August*, 1850.

Reports regarding Fruit trees imported from North America in ice.

IN March 1850, Mr. Ladd, Superintendent of the Ice House, received from his correspondent at Boston, a small consignment of American fruit trees. These trees having been taken out of the ground in the previous December, in a

than bees' wax, it comes nearest to purified *Cerin!* The *Comptes Rendus* for 1840, Tome x., p. 618, contains a communication by M. Stanislas Julien on the China wax, and the insects which yield it. The wax insects are there stated to be raised fron three species of plants, these are *Niu-tching (Rhus succedanea)*, *Tong-tsing (Ligustrum glabra)*, and the *Choui-kin*, supposed to be a species of *Hibiscus*. *Rhus succedanea*, or a nearly allied species, occurs in the Himalayah.—EDS.

dormant state, were placed in layers, between moss, in wooden boxes well fastened down, and put in the hold of the *Epaminondas*, with a cargo of ice. The experiment succeeded admirably. It was found, on opening the boxes, that all the grafts and cuttings were in a healthy state. About one-half of the consignment was purchased by the Government of Bengal, on the recommendation contained in the following letter from Dr. Falconer, Superintendent of the H. C. Botanic Garden, Calcutta, for despatch to the Superintendent of the Botanic Gardens, N. W. Provinces, for trial in the Hills. The Agricultural and Horticultural Society likewise took a proportion for their Garden, and several grafts were purchased by Messrs. Willis and Earle on account of Mr. Jeffrey Finch, of Tirhoot. The following reports will give some idea, as to how far this mode of importing plants from North America has succeeded:

To H. V. Bayley, Esq.,

Offg. Under-Secretary to Government of Bengal.

Sir,—Mr. Ladd, the Manager of the Ice House, with much spirit and enterprize has made an attempt to import young fruit trees from America, packed up in closed cases, stowed among the blocks of ice, so as constantly to keep them in the temperature of a freezing atmosphere. The plants were dug up at the beginning of the winter, when in a torpid state, and the sap not flowing: and the principle upon which the experiment was made, was to keep the buds in suspense, by means of a freezing temperature, till such time as the plants arrived in the country, so as to be able to plant them out at once, at the same season when the plants would have begun to push out their buds, had they remained in their native country.

2. The experiment is one of much interest, and I would take the liberty of recommending it for some countenance by the Government.

3. A consignment of young fruit trees upon this plan has arrived by the ship *Epaminondas*. They consist of pears, apples, cherries, peaches, plums, currants and gooseberries, amounting in all to 396 plants. One of the cases was opened in my presence on Thursday last, the 14th inst., and the contents consisting of currant bushes, were in the most perfect state of preservation. They were in precisely the same condition as when the plants had been dug out of the soil in North America. Currant and gooseberry bushes are perhaps the most favorable materials upon which the experiment could have been tried, and I did not see how it had succeeded with the peaches, pears, and plums. But the result was sufficient to warrant the presumption that a fair measure of success had been attained with these fruits also.

4. I annex for the information of his Honor the Deputy Governor, copy of a letter from Mr. Ladd to my address, dated the 15th instant; most of the fruit trees therein mentioned are unsuited to the climate of Bengal, but they are well adapted for the Hill stations in the N. W. Provinces, like Mussooree and Simla: Mr. Ladd demands Rs. 600 for the whole consignment, and I would respectfully recommend to the consideration of his Honor the Deputy Governor, that one-half of the fruit trees be purchased for Government at a cost not exceeding Rs. 300, the plants to be forwarded in glazed cases to the Superintendent of the Botanic Garden at Saharunpore.

5. The case does not admit of time for a reference to the Lieutenant-Governor, N. W. Provinces, and I solicit the favor of an early consideration of the subject by his Honor the Deputy Governor, so that Mr. Ladd may have an opportunity of offering the whole of his plants to the public, should the Government not consider it necessary to sanction the measure recommended in this letter. I have, &c.,

(Sd.) H. Falconer, M. D., *Supt.*

H. C. Botanic Garden: *18th March*, 1850.

I.—*Report on China Tea plants, and on American Fruit trees, despatched from the H. C. Botanic Garden, Calcutta, to the H. C. Botanic Garden, Saharunpore.*

[Communicated by the Government of the N. W. Provinces.]

To the Secretary to the Agricultural and Horticultural Society, Calcutta.

Revenue Dept. } SIR,—I am directed to transmit to you the accompanying copy of a letter No. 192, dated 24th ultimo, and of its enclosure from Superintendent Botanical Gardens, N. W. P., and to draw the special attention of the Society to the successful result of the importation of fruit trees from America. Dr. Falconer will be able to supply any information the Society may require regarding the plants either from Ch[illegible] r America.

I have, &c.,

HEAD QUARTERS: J. THORNTON,

The 19th June, 1850. *Secy. to Government, N. W. P.*

TO J. THORNTON, ESQ.,

Secretary to Government, N. W. P., Agra.

Tea Dept. } SIR,—In continuation of my letter No. 156, dated 10th instant, to your address, I have the honor to forward the following report on the seventeen cases of tea plants, which were dispatched from Calcutta by Dr. Falconer on the 3rd April last, reached Allahabad on the 6th, and Saharunpore on the 16th instant.

Tea plants. 2. The tea plants contained in nine Ward's cases were in pretty good order, considering the advanced season of the year. When they left Calcutta, there were as per appended table (No. 1) 912 dead and 1,515 in good condition. On reaching Allahabad, Mr. Commissioner Lowther, on examining the cases, found 1,515 plants, and of these 1,136 in good order (No. 2), and on arrival at Saharunpore on the 16th instant, 1,319 plants were found to be dead, and 1,121 alive (No. 3), or nearly 47 per cent. In the three tables there is a

considerable discrepancy of numbers, owing probably to the manner in which the plants were counted, and to others germinating in cases No. 23 and 24 en route.

3. The plants contained in cases No. 23 and 24, raised from seeds grown there, were in admirable order, their leaves being of a beautiful dark green, and healthy color, and all alive, with the exception of a few in the first row, killed, possibly, by too much exposure to the sun, as the deaths were entirely confined to this, the external row. These cases contain plants raised from seeds procured from a highly important district, viz. that of Mao Yuen, where much of the finest green teas of commerce are manufactured.

4. Case No. 20 contained 60 plants in pretty good order, and all having several green leaves, I trust, therefore, that most of them will thrive. These plants are very valuable, as Mr. Fortune states, they were procured from the district of Hway Chow, from whence most of the fine green teas of commerce is exported.

5. By a report received from the Overseer of the Kaolagir Tea Plantation in the Deyrah Dhoon, I am informed that numbers of the tea seeds received from Mr. Fortune this season have germinated; I therefore append a detailed statement shewing the dates of arrival of the different seed-parcels at Saharunpore (No. 4).* That these seeds have germinated is important, as it leads me to infer, that probably all the seeds sown in the Calcutta garden may germinate, as they had the advantage of being put much earlier into the ground. Of their condition, however, I have not as yet received any report from Dr. Falconer.

6. The four mulberry plants in case No. 24 were in excellent order, and had thrown out a number of shoots, many of them three or four inches long.

* It is not considered necessary to print these details. The tea seeds reached the Botanic Garden, Calcutta, in one or more large bags, but were put up in small packets of a seer each to send by letter dâk.—Eds.

7. The manner in which the fruit trees reached Saharunpore was most gratifying, nearly all being in most excellent order, with the exception of the gooseberries and a few currants. Many of them had thrown out shoots upwards of a foot long, and nearly all had several shoots of two and three inches in length. The success therefore attending this experiment has been perfect, and is highly creditable to all concerned. To the Captain who brought them in ice to Calcutta, to Dr. Falconer for his excellent arrangements in forwarding them from Calcutta and to Allahabad in glazed cases, and to Mr. Commissioner Lowther for his care and attention in forwarding them on to Saharunpore. Immediately on their arrival here, I forwarded them to Mussoorie, where they have all, at present, been planted, as a temporary arrangement, under the superintendence of Mr. J. Milner.

American fruit trees.

I have, &c.,

(Sd.) W. JAMESON,
Suptdt. Botanic Gardens, N. W. P.

Office of the Suptdt. Botanic Gardens, N. W. P.
Saharunpore: 24th May, 1850.

No. 1.

List and condition of Tea plants despatched by Dr. Falconer, Calcutta, on the 30th April, 1850.

No. of Box.	TEA PLANTS.			REMARKS.
	No. of Plants in good order.	No. dead or in bad condition.	Total.	
20	104	121	225	
23	347	..	347	Containing also 4 mulberries.
24	477	..	477	Containing also 4 mulberries.
25	83	207	290	
26	112	241	353	
31	50	131	181	
32	53	69	222	
33	66	51	117	
34	80	50	130	
35	143	42	185	
Total,	1,515	912	2,427	

No. 2.

List and condition of Tea plants on arrival at Allahabad on the 6th May, as per Statement of Mr. Lowther.

No. of Case.	No. of Plants in good order.*	Received in good order.	REMARKS.
Tea Plants.			
Case *E*, No. 20	104	64	
„ 23	347	411*a*	*a* This excess is ascribed to seeds germinating after despatch. Of the 4 mulberry plants in the case 3 arrived in good order, and one perished.
„ 24	477	402	
„ 25	83	34	
„ 26	112	26	
and so on, ..	†1,515	1,136	

Grand Total, .. 2,651

No. 3.

List and condition of Tea plants on arrival at Saharunpore on the 16th May, 1850.

No. of Box.	Alive.	Dead.	Total.	REMARKS.
20	61	138	199	
23	437	None.	437	
24	387	50	437	In 24 four mulberries in excellent order.
25	6	278	284	
26	16	355	371	
31	8	157	165	
32	45	80	125	
33	40	76	116	
34	36	91	127	
35	85	94	179	
Total,	1,121	1,319	2,440	

(Sd.) WM. JAMESON,
Supt. Botanic Garden, N. W. P.

* According to Dr. Falconer's list.

† Total number of plants given in this table, but detailed statement of cases from 31 to 35 inclusive, omitted in original.

No. 5.

List of Plants received from America, 16th May, 1850.

No. of Case.	Name of Plants.	Plants alive.	Plants dead.	Total.	REMARKS.
1.	Currants red, ...	7	12	19	These plants had made shoots, but all are dead but seven of one and four of the other.
„	Ditto white, ...	4	15	19	
2.	Gooseberry, Ellore seedling,	0	19	19	2 plants, stock fresh, grafts dead.
„	George 4th Peach, ..	1	1	2	In good order.
„	May Biganeau cherry, ..	1	0	1	Stock green—graft dead.
„	White ditto ditto, ..	0	1	1	In good order.
„	Jeffery's Duke ditto, ..	1	0	1	Ditto.
„	Black Tartarian ditto, ..	1	0	1	Ditto.
„	Florence ditto, ...	1	0	1	Ditto.
„	Large long Biganeau ditto,	1	0	1	Ditto.
„	Elton ditto, ...	1	0	1	Ditto.
„	Sweet Montmorency ditto,	0	1	1	Quite dead.
3.	Early Crawford peach, ..	2	1	3	Two fine and one with grafts dead.
„	Coolidges' favorite ditto, ..	2	0	2	New shoots 3 inches long.
„	Whaler's Cling ditto, ..	2	0	2	Ditto ditto.
„	Lemon Cling ditto, ..	1	0	1	In good order.
„	Rezé Montigny pear, ..	2	0	2	New shoots.
„	Dearbonis' seedling, ..	2	0	2	4 inches, shoots just made.
„	Dix ditto, ...	2	0	2	In good order.
„	Winter Nelis ditto, ..	0	1	1	Dead graft and stock.
„	Leon leclerc Vanillons do.,	2	0	2	In good order.
„	Dunmore pear, ...	2	0	2	Shoots 2 inches long.
4.	Belle Lucrative pear, ..	2	0	2	Shoots 4 inches long.
„	Paradise of autumn ditto, ..	2	0	2	Ditto ditto.
„	Louise Bonne de Jersey do.,	2	0	2	Ditto 3 ditto.
„	Madeline ditto, ...	2	0	2	Shoots just bursting.
„	Columbia, ditto, ...	1	0	1	New shoots just made.
„	Lawrence ditto, ...	2	0	2	4 inches shoots.
„	Jargonelle ditto, ...	2	0	2	Shoots one inch long.
„	St. Geslain, ditto, ...	2	0	2	Ditto 3 ditto.
„	Beurre Diel ditto, ..	1	0	1	Ditto 4 ditto.
5.	Passe colmar pear, ..	1	1	2	Stock green, grafts dead.
„	Flemish beauty ditto, ..	1	1	2	In good order.
„	Long green of autumn do.	2	0	2	Shoots fresh, and 2 inches long.
„	Hull ditto, ...	2	0	2	In good order.
„	Glout Morceau ditto, ..	2	0	2	Ditto.
„	Bartlett, ...	1	0	1	Ditto.
„	Greengage Plum, ...	2	0	2	Ditto.
„	Coss golden drop ditto, ..	2	0	2	Shoots 2 inches long.
	Carried over, ..	64	53	117	

No. of Case.	Name of Plants.	Plants alive.	Plants dead.	Total.	REMARKS.
	Brought forward, ..	64	53	117	
5.	Jefferson's Plum, ...	2	0	2	Shoots in good order.
„	Early bough apple, ..	1	0	1	Shoots 6 inches long.
„	Northern spy ditto, ..	1	0	1	In good order.
„	Baldwin ditto, ...	1	0	1	6 inches shoots.
„	Red Astrachan ditto, ..	1	0	1	In good order.
„	Early harvest ditto, ..	1	0	1	Ditto.
„	Ladies sweeting ditto, ..	1	0	1	Ditto.
6.	White currant, ...	4	2	6	Three out of the four are still fresh in the wood.
„	Red ditto, ...	2	4	6	
„	Gooseberry, Ellore seedling,	0	5	5	
„	Florence cherry, ...	1	0	1	In good order.
„	Dix pears, ...	1	0	1	Ditto.
„	Honey heart cherry, ..	1	0	1	With new shoots.
„	Dearbonis' seedling pear,	1	0	1	In good order.
„	Black Tartarian cherry, ..	1	0	1	Ditto.
„	Columbia pear, ...	1	0	1	Ditto.
„	Hull ditto, ...	1	0	1	Ditto.
„	Winter Nelis, ...	0	1	1	Quite dead stock and grafts.
„	Paradise D'Autumn, ..	1	0	1	Shoots one foot long.
	Grand Total, ..	86	65	151	

E. E.

(Sd.) W. JAMESON,

Supt. Botanic Gardens, N. W. P.

OFFICE OF SUPT. BOT. GARDENS, N. W. P.

SAHARUNPORE :

The 24th May, 1850.

Abstract number of American Plants.

1.	Currants, red, ...	25 plants.
2.	Ditto, white, ...	25 „
3.	Gooseberries, ...	24 „
4.	Apples, ...	6 „
5.	Cherries, ...	11 „
6.	Peaches, ...	10 „
7.	Pears, ...	44 „
8.	Plums, ...	6 „
	Total, ..	151 „

(Sd.) W. JAMESON,

Supt. Botanic Gardens, N. W. P.

II.—*Reports from the Messrs. Finch of Tirhoot, regarding the condition of the American fruit trees received per Epaminondas.*

[Communicated by Willis Earle, Esq.]

I send you, demi-officially, Mr. Jeffrey Finch's, or rather his brother Mr. Justin Finch's report, on the state and condition of the American fruit trees, (despatched to Shahpore Oondee, Tirhoot, by Steamer, the 15th April last,)—in date of the 31st May,—in order that it may be communicated, if thought worth while, to the Society, or at least to the Garden Committee.

I mention briefly the number of trees, &c. sent to Mr. Finch, and received by him on the morning of the 29th April.

45 in all, grafts and bushes.	22 Pears,....	all alive and well, save the St. Gislain, drooping, and the Louise Bonne de Jersey, Columbia and Glout Morceau in a doubtful state.
	4 Peaches, 3 Plums, 3 Cherries, 1 Apple, 6 Currant trees.	received all alive and well.
	6 Gooseberry ditto,...	received 4 alive,—1 dying—1 dead—roots appeared insufficient.

With the exception of the gooseberries—all dead—the report you will observe is of a favorable nature; the pears had recovered, and all are pronounced healthy I may say—except 1 peach, George IV. weak.

1 ditto, lemon Clingstone, very weak.

1 plum, greengage, shewing signs of weakness.

1 cherry, sweet Montmorency, looked dried, but is shooting again.

1 ditto, Davenport, dried up to all appearance.

It is somewhat remarkable, that the stone-fruits appear to be suffering the most. Mr. J. Finch seems disposed to think Tirhoot may be unfavorable to the gooseberry, but he observed that the roots of the bushes were deficient.

Thus, considering that the plants have passed through a fiery ordeal (ending only the 5th June, when the weather changed and rain fell)—I think they have come out so far well.

CALCUTTA: *June 13th*, 1850.

"It being now a full month since we put down all the Ame-"rican fruit grafts and bushes, it is time that you should "have some account from me, to let you know how they have "been coming on under our management; with this view "I enclose a report in full of each *individual*, drawn up by "Justin, who has been the managing hand from the first, "and has been taking a great deal of pains after the put-"ting down, and all the subsequent looking after of all the "grafts and bushes. By his report you will see, that with few "exceptions, all the pears are likely to succeed: of the "peaches, one is lost lately, though all four were in excellent "health not many days ago. One of the three plums we "shall also lose, and perhaps of the three cherries, two—"one being already dead. The single apple luckily has, "as yet, stood out, and looks well: all the six currant bushes "seem to be thriving, but the gooseberries have all been "lost, only one of the six was at all in strong health, and "with good quantity of roots, but I fear from the sudden "manner in which even this fine healthy strong bush went "off, that the climate is adverse to their growth here. "Justin has appended some remarks to his report in regard "to the bad weather we have had, and the unfavorable time "at which we received the grafts, and in which I quite "coincide with him;—it is quite surprising how any of "these grafts have held out the scorching heat we have had, "a sufficient proof, I may say, that under more favorable "circumstances, the experiment would have succeeded well. "It would be interesting to us to know how the grafts "have been coming on at the Botanical and at our Society's

" Gardens, and when you are able, if you would give us
" a line, we would feel obliged."

SHAHPORE OONDEE: *7th June,* 1850.

No. 1. Case of plants were put down, evening 3rd May, 1850.
No. 2. ditto ditto ditto ditto, 4th May, 1850.

'After which there was mild cool weather for two days, 'from which time until 19th, there was very hot weather, 'with continued hot westerly winds, sometimes both during 'the day and night. From the 19th up to the present time 'there has been a cessation of the hot westerly winds, but 'the weather is excessively dry, with an intense sun. Ther- 'mometer at 100°—6 A. M.—and all this upon a long con- 'tinued drought of upwards of two months and a half, 'therefore, it may be supposed with reason, that these plants 'have not had a fair chance. If they had arrived at the com- 'mencement of the spring, which may be considered to set in 'with the month of February, it is very probable the experi- 'ment would have been entirely satisfactory. The treatment 'pursued has been nothing peculiar; saving the plants from 'the fiery winds and intense power of the midday sun, by 'proper shelter and a proper quantum of watering and 'airing during the nights, is the course which has been 'adopted.'

SHAHPORE OONDEE: 31*st May,* 1850.

The above is the report of Mr. Justin Finch, brother of Mr. Jeffrey Finch, to whose especial care the treatment of the plants was entrusted.

W. E.

Report on the American fruit trees sent to Jeffrey Finch, Esq., Shahpore Oondee, Tirhoot, 31*st May,* 1850.

Pears, ..	.. Glout Morceaux, ..	.. Healthy.
,,	Beurre Diel, ..	.. .. Ditto.

22 Pears sent, ..	Pase Colmar, ...	Healthy.
22 Pears received	St. Gislain, ...	Ditto.
and now alive as	Bartlett, ...	Without new shoots
per this report.		yet: looking well.
W. E.	Paradise of Autumn, ..	Healthy.
,,	Dix, ...	Just putting forth new shoots.
,,	Dearbonis' seedling, ..	Very weak, no new shoots.
,,	Louise Bonne de Jersey, ..	Healthy.
,,	Columbia, ...	Now beginning to shoot.
,,	Jargonelle, ...	Healthy.
,,	Madeline, ...	Ditto.
,,	Rezé Montigny, ...	Ditto.
,,	Belle Lucrative, ...	Ditto.
,,	Easter Beurre, ...	Ditto.
,,	Long Green of Autumn, ..	Ditto.
,,	Winter Nelis, ...	Ditto.
,,	Lawrence, ...	Ditto.
,,	Dunmore, ...	Ditto.
,,	Leon le Clerc Vanillons, ..	Ditto.
,,	Flemish Beauty, ...	Ditto.
,,	Belle Montigny, ...	Ditto.
Peaches, ..	Coolridge Favorite, ..	Ditto.
4 Peaches sent and	Early Crawford, ...	Ditto.
received alive.	George IV., ...	Weak.
W. E.	Lemon Clingstone, ...	Very weak.
Plums, ...	Green Gage, ...	Showing signs of
3 Plums sent and		weakness.
received alive.	Jefferson, ...	Healthy.
W. E.	Golden Drop, ...	Ditto.
Cherries, ..	May Bigganeau, ...	Ditto.
3 Cherries sent and	Sweet Montmorency, ..	Looked dried, shooting
received alive.		again.
W. E.	Davenport, ...	Dried up to all appearance.
Apple, ...	Red Astrachan, ...	Healthy.
1 Apple only sent and received alive. W. E.		

Currant Bushes. 6 Currants sent all received alive.—W. E.	All six doing well, one a little sickly but now recovering.
Gooseberry Bushes. 6 Gooseberries sent, 4 received alive, 1 dead, 1 dying; roots said to be deficient.—W. E.	All six lost—two found dead on opening the case, one died almost immediately after, and the remainder a few days after. It may be remarked, that these 6 bushes, with one exception, were almost without roots.

(Sd.) Justin Finch.

Extract of a letter from Willis Earle, Esq., dated Calcutta, August 9, 1850.

I have much pleasure in sending you enclosed, a copy of Mr. Justin Finch's report on the American fruit trees,—in the garden of his brother Mr. Jeffrey Finch, of Shahpore Oondee, Tirhoot—dated 24th July last, with a Postscript dated July 30th, do.—after they had all been planted out in the places where they are intended to remain. Mr. Jeffrey Finch, in his letter of the 31st July received this day,—adds in reference to his brother's report, that "since the planting out the trees are looking well,"—and barring "the ravages of the white-ants,"—he thinks may 'now' be expected 'to do well.'

He is anxious to have the report on the Society's trees,—also the further report, when obtained, on those sent up the country by Dr. Falconer,—and I may add for him, on those still remaining in the Hon'ble Company's Botanic Garden.

Report of the American Plants, 24th July, 1850, *in the Garden of Jeffrey Finch, Esq., Shahpore Oondee, Tirhoot.*

		Alive.	Dead.
Pears,	1 Glout Morceaux, ...	1	0
,,	1 Beurre Diel, ...	0	1
,,	1 Passe Colmar, . ..	1	0

Pears,	1	St. Gislain, ...	1	0	
,,	1	Bartlett, ...	0	1	
,,	1	Paradise of Autumn, ...	1	0	
,,	1	Dix, ...	1	0	
,,	1	Dearbonis seedling, ...	0	1	
,,	1	Louise Bonne de Jersey, ..	1	0	
,,	1	Columbia, ...	1	0	Withering.
,,	1	Jargonelle, ...	1	0	
,,	1	Madeline, ...	1	0	
,,	1	Rezé Montigny, ...	1	0	
,,	1	Belle Lucrative, ...	1	0	
,,	1	Easter Buerre, ...	1	0	
,,	1	Long Green of Autumn, ...	1	0	
,,	1	Winter Nelis, ...	0	1	
,,	1	Lawrence, ...	1	0	Withering.
,,	1	Dunmore, ...	1	0	
,,	1	Leon le Clerc Vanillons, ...	1	0	
,,	1	Flemish Beauty, ...	1	0	
,,	1	Belle Montigny, ...	1	0	
Apples,	1	Red Astrachan, ...	1	0	Healthy.
Peaches,	1	Coolridge Favorite, ...	1	0	Ditto.
,,	1	Early Crawford, ...	0	1	Dried up.
,,	1	George IV., ...	0	1	Lost by accident.
,,	1	Lemon Clingstone, ...	1	1	Healthy.
Plums,	1	Green Gage, ...	0	1	
,,	1	Jefferson, ...	1	0	Not very strong.
,,	1	Golden Drop, ...	1	0	Ditto.
Cherries,	1	May Begganeau, ...	1	0	Always delicate.
,,	1	Sweet Montmorency, ...	1	0	
,,	1	Golden Drop, ...	1	0	
Currants, red and white,	6,	.. .. ..	0	6	Dried off after the first rains.
Gooseberries	6,	.. ..	0	6	Reported before.

Remarks relating to the Pear Trees.

It is surprising that one or two of the freshest looking of these pears should have dried off, the decay at first commencing at the top of the graft, which turned black, and in the course of 3 days the entire stock was gone—in one instance only the stock had not dried. These grafts have not yet taken to the soil, being very slow in giving out

strong shoots; the plants are still in the nursery bed, whence it would be perhaps unsafe to remove them before they have required strength.

24th July, 1850.

GENERAL REMARKS.

The plants seemed to hold out well enough up to the 20th June, and up to which date there had been a continuance of very favorable weather for several days, with moderate rain and cool temperature; nevertheless, with few exceptions, they did not throw out any new and vigorous shoots, but seemed as if stationary. The above mentioned fine weather was followed by close sultry weather, with a powerful sun, and a prevalence of southerly winds for some days; this wind is considered to be baneful in its effects on vegetation in this part of the country, and probably herein lies the mischief. Ths season throughout has been exceedingly severe and trying for such experiments.

July 30, 1850.—The plants have been planted out in the different spots which they are intended to occupy, this course being deemed advisable from the circumstance of the white-ant having attacked two of them, viz. those marked "*withering*" and utterly destroying them, these are the first cases, and to prevent further ravages if possible, the plants have been removed to other localities. Planted out July 28th, 29th, and 30th.

GENERAL SUMMARY.

22 Pears, 4 died and 2 withering.
1 Apple, healthy.
4 Peaches, 2 healthy, 1 dried up, and 1 lost by accident.
3 Plums, 1 ditto, and 2 not very strong.
3 Cherries, always delicate.
6 Currants, (red and white,) died off after the first rains.
6 Gooseberries, dead.

III.—*Report on the American Fruit Trees, received and potted on the 26th March,* 1850.

[Communicated by Mr. J. McMurray, Gardener to the Society.]

Names.	Number of plants in pots.	Number of plants planted in the open ground.	Date of planting in open ground.	Grand Total.	REMARKS.
Apples, ..	3	3	26th July, 1850,	6	One of the 3 in pots sickly.
Pears, ..	3	3	Ditto, ..	6	All in healthy condition.
Plums, ..	1	2	Ditto, ..	3	Ditto ditto
Peaches, ..	4	4	25th June, 1850,	8	Ditto ditto.
Cherries, ..	2	3	26th July, 1850,	5	Ditto ditto.
Currants, ..	6	6	Ditto, ..	12	One of the 6 in pots sickly.
Gooseberries,	6	..	Ditto, ..	6	All dead, none of them were planted out.
	25	21	.. .. ..	46	

General Remarks on the treatment of the above trees from the period of their arrival till the time of planting out.

On receipt of the trees they were put in pots sufficiently large to afford the roots plenty of room. The soil used was that which the garden supplies, mixed with about half leaf-mould. When potted they were placed under a temporary shade of mats (one mat in thickness), with a framework of bamboo, erected for the support of the shading above, and to rest a screen against the sides to protect them from the high breeze: while a *double* screen was placed on the west side to protect them from the afternoon sun. The mats were always placed over the plants on a sunshiny day, but not on a cloudy day, except as a protection against rain. They were altogether removed in the evening, and kept off the whole night except when there was a probability of rain. Water was given in small quantities, according to the state of the weather and of the plants.

AGRI-HORTICULTURAL SOCIETY'S GARDEN:
3rd August, 1850.

Extract from the Gardener's Monthly Report, dated 9th November, 1850, and submitted at a General Meeting of the Society, held on the same date.

In submitting my report I have to state as regards the American fruit trees, that since planted out, they have, on the whole, progressed satisfactorily. In the case of the apples, the three planted out previous to the date of my last report (3d last August) are all doing well; one of the three in pots, then reported sickly, has since died. Since the date of my last report one of the three pears, in pots, has died.

The plums are all in good condition. The peaches are also doing well: if any difference, those planted out are the best. The whole of the cherries that were planted out have died, such as have been kept in pots continue in a healthy state.

All the currants in pots are thriving; two of the six planted out have died.

From the limited number of each sort of fruit trees, which have been under experiment, as well as from the short time I have had for observation, it may seem premature in my offering an opinion, still I cannot help stating from what I have seen of the apple, the pear, and the peach, that they are more likely than the others to endure the climate of Bengal, and I would respectfully suggest that it would be desirable for the Society to repeat the experiment on a more extended scale.

Report from Mr. Price, Supt. of the Dacca Cotton Farm, respecting the working of the Cottage Saw-Gin.

[Communicated by the Government of Bengal.]

To James Hume, Esq., *Honorary Secretary Agri-Horticultural Society.*

Revenue. Sir,—I am directed by the Hon'ble the Deputy Governor to forward for the Society's information, the accompanying copy of a report from Mr. Price, Superintendent of

the Dacca Cotton Farm, dated the 16th February last, on the working of the cottage saw-gin received from England in November last.

I have, &c.,
H. V. Bayley,
Offg. Under-Secy. to the Govt. of Bengal.

To R. H. Mytton, Esq.,
Offg. Commissioner of Dacca.

Sir,—In reply to your letter of the 28th December 1849, No. 226, respecting the working of the new saw-gin, I have the honor of informing you, that I find it well suited for cleaning the American and Bourbon kinds of cotton, but the gratings through which the saws work are too wide for cleaning the indigenous kinds, the seed of which is very small, and in consequence of which a great portion of it passes through with the wool. This evil in preparing others for ginning that description of cotton could be easily avoided, but in doing which, particular attention would be required in the arranging of the saws so as to make them revolve exactly true to prevent the teeth of the saws coming in contact with the edge of the bars. If this was effected, and its price came within their means, it would make it a very valuable machine to the natives in cotton-growing districts. The speed of this one, in cleaning exotic cotton, is good, in fact equal to that of the large American gins in proportion to the number of saws, but eight or ten saws would be still better suited for the purpose than only four, the number in this one, for several reasons. In the first place, the same number of hands would work it and clean double the quantity of cotton, and secondly, it would be much easier fed from the room—that the feeder would have to scatter the cotton across the saws so as to assist them in quick ginning, besides the very small space that the cotton has to revolve in when in contact with the saws, the friction against the sides of the feeding box is very con-

siderable. It affords me much pleasure in being able to report to you that three hands are able to clean as much cotton in a day with this small gin as thirty hands are capable of doing with the Dacca native *churka*, and with a few additional saws, I am confident the proportion would be greater.

I have, &c.,

DACCA GOVT. FARM: (Sd.) J. O. PRICE,
The 16th February, 1850. *Govt. Cotton Planter.*

On the culture and manufacture of Safflower, as practised in the district of Dacca. Communicated by J. G. FRENCH, ESQ.

To JAMES HUME, ESQ., *Honorary Secretary Agri-Horticultural Society of India.*

DEAR SIR,—In compliance with your request that I would furnish the Society with some notes regarding the culture of the Safflower plant (*Carthamus tinctorius* of Botanists, and *Koossoom-Phool* of the Natives), and the mode of its manufacture into a mercantile product, as practised in this district, I have the pleasure to describe as follows.

The most appropriate soil would appear to be a rich sandy loam, such as is found on *churs* of old formation and higher lands subject to the yearly inundation: shortly after the subsidence of which, so soon as the land has become sufficiently dry, it is thoroughly cultivated by repeated ploughings and *maij*-ings to the entire removal of all weeds with the stalks and roots of the bye-gone crop, usually a rice one. Six *seers* of seed, ample quantity for the *bhigah* of 102 by 85 cubits, is sown broad-cast, another slight ploughing given and the *maij*, or Bengallee substitute for a roller, passed over the surface, leaving the grains buried some two or three inches. The young plants make their appearance in a few days, and the land is frequently and carefully weeded until they attain a height of ten inches or a foot; when the crop, if plentiful,

requires no further attention, as it effectually prevents thenceforward all vegetation but its own. The sowing season is from the beginning of the month *Kartick* until the 10th of *Ogrohn*—say from the middle of October till the end of November—and the earlier, weather permitting, within that period the better, that the produce, or a large portion of it, may be secured before the setting in of the periodical north-westers at the close of February or commencement of March: as every shower greatly reduces the quantity as well as deteriorates the quality of the flowers collected the day it falls: strong winds are injurious to the crop but not irremediably so, while hail is perfect destruction, laying the whole field prostrate beyond the possibility of recovery. The gathering and manufacture however continue as long as blossoms are available, in a favorable season, even till May.

About the middle of January, the first blossoms appear, and every second day the cultivator, with a cloth tied apron-fashion round his waist to hold the petals, proceeds to strip them from the seed-vessels with the tips of thumb and fingers of his right hand, taking especial care that they be not mixed with any extraneous matter as bits of stalk or decayed leaves. On the evening of the day when they are gathered the flowers are partially wetted and stamped for a short time into a pulpy mass, which is set aside for the night in wide-mouthed *gumlahs*, with water enough to keep it in a moist state until the morning's operations. Early next day, a clean *moloöäh* mat being placed on a slight declivity that the yellow valueless juice may the more freely flow off, a quantity of the mass, as much as would half fill a stable bucket, is cast upon its elevated end, and the operator, supporting himself by a stick in each hand, commences turning it over and over, kneading it with his feet; and as it dries under his pedipulation, supplying a little fresh water now and then until he finds it run off perfectly clear, and untinged by the least shade of yellow, when the simple process is completed. Portions

of the prepared mass of the size of a walnut are now taken between the palms, and as much moisture as possible expelled by manual pressure: the flat round cakes thus produced are next exposed to the rays of the sun on mats or coarse country canvas, and when thoroughly dried, present the Safflower of commerce; of which eight or nine seers from the *bhigah* is considered a fair out-turn.

The Safflower is a remunerative crop to the *rayut*, only occupying his land for seven or eight months at the utmost, which is then sown with his *āmman dhan*, the rice of the rains. The seed, which is abundant, as none has been removed or injured while making the dye, sells for about a rupee the maund in the bazaars; and from what is not disposed of or reserved for next season's sowing, an impure oil is extracted by pounding and boiling: this is only used for burning, as it soon becomes turbid and offensive, indeed when newly made, is unfit for culinary purposes. The refuse is devoured by cattle and poultry, which thrive thereon, and the dried stalks of the plant are collected by the poor for fuel.

The cultivation of Safflower and its money-value have increased greatly of late years from competition in the Calcutta market; several mercantile firms and individuals having agents on the spot to purchase the commodity as soon as made: 50 to 55 Company's Rupees per maund were given for the best descriptions of the last crop. It varies much in quality and purity, being particularly obnoxious to adulteration by the native growers: while I understand that attempts to produce it *neez chass*—as some factories cultivate their indigo or portions of it—have proved signal failures; the additional price procurable for the pure product not covering the risk and cost of home production. As with cotton, peppers, hemp, and indeed nearly every kind of Bengal husbandry, the *rayuts* have the advantage in cheapness of their old men, women and children to weed and gather, and pay constant attention to the fields, preventing injury from

trespassing cattle, &c., which makes all the difference of the Safflower crops being paying ones to them and the reverse to the European speculator on an extensive scale. Safflower is said to have been formerly grown solely for the evanescent yellow the petals so readily yield, while their valuable properties being unknown, they were then thrown away as so much rubbish.

MOONSHEEGUNGE, DACCA: I remain, &c.,
The 11th September, 1850. JNO. GILMORE FRENCH.

On the cultivation of Mexican Cotton in India as a tropical plant.

In August 1847, and again in March, 1848 and April 1849, Dr. Wight, Superintendent of Government Cotton Farms, Coimbatore, forwarded to the Society some remarks regarding the culture of the Mexican Cotton in India, and the proper season for sowing it (see Journal Volume VI. pp. 118 and 190, and Volume VII. page 20), in which he states it as his opinion that an error has been committed in cultivating this variety of cotton as an *extra tropical* plant, and that, treated as a tropical plant, he conceives that nearly every part of India is adapted to its successful cultivation. With the view of assisting to test this hypothesis, as regards Bengal and the N. W. Provinces, the Society obtained in June 1848, a quantity of acclimated seed of the 9th generation from Dr. Wight, and distributed it to such of their Members as they conceived would make the experiment, and favor them with reports and samples. The following is the result of such experiments; and though, from various untoward circumstances, only partial returns have been obtained, and those are not so full as could be desired, still they are deemed sufficiently interesting for publication, if only tending to prove the fact, as shewn by the report of the Society's

Committee, that cotton, so far removed from the original stock, can be raised in India of a quality equal in every respect to "good fair to good middling" Mexican or New Orleans, cotton.

Report on samples of Cotton raised from Mexican seed acclimated in the Government Farm at Coimbatore; and on a muster of "Protective" cotton.

Before giving their report in detail on the undermentioned, your Committee desire to remark, that the musters marked A to JJ, have been raised from seed acclimated, they believe, for several generations, forwarded by Dr. Wight to the Society in June 1848; and that those marked K, L and M have been raised from acclimated seed, also received from Coimbatore, in June 1849.

Lucknow.

A.—Samples of "*Kupass*" or seeded cotton Nos. 1, 2 and 3. Grown in the public garden at Lucknow. Received from Captain G. E. Hollings, Manager of the garden, with memorandum from Mr. Purvis, the Head Gardener, dated March 1849.

Remarks on the treatment of the Mexican cotton plants from seed received from Dr. Wight of Coimbatore through the Secretary Agri-Horticultural Society of Calcutta, grown in the Public Garden at Lucknow.—By Mr. Purvis, Head Gardener.

On the 20th of July a piece of good ground that had been previously occupied by vegetables, 22 yards in length, and 13 in breadth, was sown in drills 3-feet apart, having received no other preparation than an irrigation, and a couple of ploughings. From the time of sowing to the end of the month, sufficient rain did not fall to penetrate to the depth the seed was sown. The range of the thermometer (Farenheit's) being on an average from day-break to sunrise 80·5, at noon 95, and at sunset 85·5; it was hung on a small *Cassia* tree adjoining the cotton plantation. On the night of the 2nd and morning of the 3rd of August, there was a good fall of rain and the plants came up very strong on the 7th, and after having obtained the height of 6 inches, they were thinned

out to the distance of a foot and a half apart; there was a good fall of rain on the 14th and again on the night of the 15th, the plants growing all the while rapidly and healthily. There was a good shower again on the 24th and a few very slight drizzling showers on the 27th and 28th. The average range of the thermometer of the month being from day-break to sunrise 79·5, at noon 91·75, and at sunset 83·8. I forgot to mention that at the time of thinning, they were cleared of weeds and the ground dug between the rows. There was a good shower on the morning of the 9th and a good fall of rain on the 10th of September. On the 16th, a few of the plants bloomed and having become crowded, they were again thinned to the distance of 2 and 3 feet apart, and cleared of weeds and dug as before; dry and parching winds were at this time prevalent, and there was no more rain during the month. The average range of the thermometer being from day-break to sunrise 73·25, at noon 94, and at sunset 83·25. On the 1st of October they were irrigated, the whole of the plants being in bloom, and in many places growing into a jungle. On the 5th there was a slight shower, and on the 19th they were again irrigated. On the 27th, 9 bolls were gathered from the few plants that first bloomed, the average range of the thermometer for the month being from day-break to sunrise 68, at noon 101, and at sunset 85. On the 18th of November they were again irrigated; about this time a red insect made its appearance, which up to the present time has committed much damage among the bolls. Many of the plants are now upwards of 5 feet in height and 4 in diameter, consequently they are in many places much crowded. These plants have at the present time from 40 to 50 bolls each on them, the average height is from 3½ to 4 feet, and diameter about 3½. Another piece of ground of the same dimensions as the above, was sown on the 7th of August, and the young plants made their appearance on the 16th. They were thinned, &c. the same as the first sowing, they are not near so robust as the former, owing probably to the soil being rather inferior. A third piece of ground was sown on the 24th of October, but the seeds have not germinated.

G E. Hollings,
Manager L.A.H.S. Garden.

Nos. 1 *and* 2.—Good cotton, of finer staple than No. 3. Some of No. 2 stained, and several of the seeds smooth and black, like Sea Island, the fibre of such being very slightly adherent.

No. 3.—This muster is tolerably clean, staple short, very adherent to the seed, of fair strength, and good color.

Nos. 1 and 2 may be valued at from 4¼*d.* to 4½*d.* per ℔., and No. 3 at 4*d.*

This cotton appears to have received garden care and culture, which should be avoided in experiments of this kind. The same soils should be chosen as are obtainable, the same treatment observed as is usual and practicable, in field cultivation on a large scale.

Banda.

B.—One sample of cleaned cotton only. Specimen grown in the garden of Mr. M. P. Edgeworth, Collector of Banda; see his letter in accompaniment, dated 11th April 1849.

I beg to inform you that I have sent by dâk bhanghy, addressed to Deputy Secretary to Government, a small sample (½ seer) of the cotton; produce of the Mexican seed with which you favored me.

2d. The seed, rather less than ½ seer, was sown in a field a little less than a *biga*, or about 4-10 acre, in my compound in the first week of last July. The soil is of 3d rate quality, termed *Purwa;* it was not irrigated, but treated exactly as the common country cotton. It vegetated freely, began to bear at the close of October, and produced 13½ seers of cleaned cotton—and 30 seers (of 80 Rs.) of seed. A good deal of the latter however is bad.

3d. The plants are still alive and bearing; which shows them to be much hardier than the *dêsee* cotton, which was all killed by the January frosts.

4th. From this experiment I think the kind of cotton well suited to this part of the country and likely to be quite as prolific as the common cotton, if the people can be induced to cultivate it.

5th. I sent small portions to two other places; in one, the crop which was reported as exceedingly flourishing was maliciously destroyed. In the other site, in the hill pergunnah of Kuliangurh, the total failure of the rains prevented the plant from coming to maturity.

6th. The cotton dealers here, to whom I have shown the produce, pronounce it of very good quality, and that if there were enough produced it would command a high price in the market.

7th. I adopt this official mode of communication as I am about to leave the district, and I wish to leave the result of this experiment on record.

ZILLAH BANDA : *the* 11*th April,* 1849.

Of excellent quality, tolerably clean, good fair length of staple: very similar to "good fair to good middling" Orleans cotton in color and quality. Valued at $5\frac{1}{4}d.$ per ℔.

This muster having been sent, freed from seed, it is impossible to form so just an opinion of it, as if it had been received both in pod and as *kupass,* which should always be sent with some of the cotton, country-cleaned.

This experiment has been very judiciously managed. Mr. Edgeworth having treated the cotton in cultivation exactly as the common country cotton. It has been grown too without irrigation, and on what is called a third rate soil.

Allahabad.

C.—Samples.
No. 1. *Kupass.* Garden, first growth.
No. 2. Ditto, second crop.
No. 3. Ditto, village produce, last crop.
No. 4. Ditto ditto, 2nd ditto.

Specimens of seed-cotton grown at Allahabad and its vicinity, received from Mr. R. Lowther, Commissioner of Revenue at Allahabad, with communications under date 1st May, 5th May, and 27th June, 1849.

With reference to your letter, dated the 2d ultimo, I have the pleasure to advise you of the despatch per *Soorma* of a small box of *Kupass* [C. (1)] the produce of my own garden. I planted a small bed measuring 42 feet by 18 on the end of June, and gathered from the first crop 16½ seers, a second crop is now being gathered, a small portion of the produce of which I have enclosed in a bag [see sample C. (2)] which you will find in the box; it ripened about a fortnight ago—260 plants, nearly 6 feet high, stand on the area and are very healthy. The season was by no means favourable—the rain was very scanty when most required, and abundant when likely to prove injurious to the produce: I think the area above stated equals about half a *biswa.* The box now

forwarded contains about 10 seers of 80 Sicca weight of the first produce and ½ seer of the 2d crop. The present temperature at noon in the garden is 132.° My *mallee* was much surprised to find the plants yielding a second crop. I enclose the fourth part of one of the buds I plucked this morning. I gave the whole of the seed, with exception to the small quantity I used in my own garden, to an extensive landholder; it was sown on the best cotton soil where wells are not used, and proved almost a total failure from the drought. I do not think the Mexican cotton could be cultivated in Bundlecund with any degree of success as the seasons are not to be depended upon; but in any part of the country, where irrigation is available, it might be turned to a good account even in seasons of drought. The cotton in my garden was irrigated from a spring well. The first crop I think began to ripen in September.

ALLAHABAD: 1*st May*, 1849.

In continuation of my letter, dated the 1st instant, I have the pleasure to advise you of the dispatch on the 3rd idem of a box containing 4 seers of *Kupas* of *village* produce from the Mexican seed you sent me; only 11 seers were produced on 3 *biswas* of land, the remainder sown on other parts totally failed from drought.—[Sample C. (3.)]
5*th May*.

I forwarded to you a few days ago per *Sutlege*, a small box of Mexican cotton, sown in July last, and gathered from the same plants as the last specimen I sent you, but up to so late a date as the 15th instant. The Mexican cotton plant will stand any heat provided it is properly irrigated. The temperature has been unusually high this year. An *Aloo Bokhara* tree in full bearing near the cotton plants was destroyed, and the leaves of some *loquat* trees and plantains scorched, the former a deep red; whereas the cotton plants under the same temperature was strong and healthy and strange to say threw out a thin crop of blossoms, which however was destroyed a few days ago by a heavy fall of rain, but others have burst forth and several pods are coming forward.

ALLAHABAD: 27*th June*, 1849.

No. 1.—Raised in Mr. Lowther's garden and irrigated. A good strong cotton, seeds well covered, of fair whitish color, but not equal to the Banda raised specimen; valued at 4½*d.* per ℔.

No. 2.—Second crop; irrigated also; not so strong in staple as No. 1, and perhaps less clean. Valued at 4¼*d.* per ℔.

No. 3.—Village produce. Less clean than No. 1, but of fair staple; seeds well covered. Valued at 4¼*d.* per ℔.

No. 4. Village produce, second gathering. Closely resembling, and fully equal to No. 1. Valued at 4½*d.* per ℔.

The fibre of all the above musters is strongly tenacious of the seed.

N. B.—The village produce generally failed through extreme drought and want of irrigation.

Benares.

D. 1 to 4. No. 1. Uncleaned cotton. No. 2. Cleaned ditto. Nos. 3 and 4. Two bolls only.	Specimens grown in the public garden at Benares. See letters of Messrs. D. F. McLeod, C. S., and Geo. Nicholls, dated respectively 12th and 29th April, 1849.

Your letter of the 2nd current has been put into my hand on my arrival at this place on my way to Lahore; and as my connection with Banâras has been dissolved, I have forwarded it to Mr. Nicholls, who is the Secretary of the Garden Committee there; and trust he will be able at once to furnish you with the information required.

Banâras is unfortunately not by any means a cotton district—and the seed arrived very late in the season—so that it was sown to disadvantage. Yet the produce has been very superior to that of the country cottons. A large quantity for the area sown had been plucked before I came away, and it continued flowering and bearing in a remarkable manner; so that it appeared as if the pickings would be continued for another month or two.

LUDHIANA: 12*th April,* 1849. D. F. McLEOD.

Your note of the 2nd instant to Mr. D. F. McLeod was, by that gentleman, sent to me from Ludhiana on the 12th instant, with a request that I would reply to it. By some unaccountable mistake the whole Ludhiana Mail of that date, instead of coming here, went on to Calcutta, so that Mr. McLeod's letter and yours did not reach me till the 26th instant.

I have submitted your note to our Garden Committee, and am directed to forward the accompanying report, which I do with much pleasure, and hope it will meet with your approval. I am but new in these matters,

but shall be most happy to correspond with you, and to render you any assistance in Horticultural proceedings that I can.

Report on the acclimated Mexican Cotton Seed.

Packet No. 1 contains a muster of the cotton uncleaned.
Ditto No. 2 ditto ditto ditto cleaned.

This cotton was raised in the Public Garden at Secrole; it was sown immediately after its arrival in the first week of August, and as we had had then more than a month's rain, the plant had scarcely a fair trial, being sown so late in the season. The quantity of land sown was about half a *biggah*; of the weight sown, I regret to say I have no memorandum, but it is thought to have been about 1½ seer more or less.

The produce has as yet been 52 seers, and the plant is still bearing. The plant appears small and stunted, being sown so late, still it is a very prolific bearer. The soil in which it was sown is a stiffish clayey one.

I gave small quantities of the seed to three gentlemen, who had Indigo Factories in this neighbourhood, with a request that they would distribute it among the natives in their vicinity, and favor me with a report of the result. One gentleman is unfortunately dead, and another has left the factory. The third gentleman informs me that the people could only sow the cotton in fields containing their green crops *(khurif)*, and these failing for want of rain, they were obliged to plough up their fields, and the seed so distributed was consequently lost.

Nos. 3 and 4 are samples sown in a corner of my own garden at the College premises close to the city. The ground is tolerably good garden mould, and the place where the cotton was sown is mixed with a great deal of broken tile and broken pottery. The seed was sown in August, and the plants, though not tall, were strong and healthy; the flowers large and fine-loooking, and the pods pretty large when ripe. The plant is still bearing.

BENARES: *the 29th April*, 1849. GEO. NICHOLLS,
Secretary Public Garden Committee.

No. 1. "*Kupass.*" Staple short, meagre, apparently grown out of season, as reported. Valued 2¼*d.* per ℔.

No. 2. Same cotton in a cleaned state, valued at 3¾*d.* per ℔.

Nos. 3. *and* 4. Only one pod of each sent, from plants in garden soil and under garden treatment, on which we give no opinion.

Gorruckpore.

E.—Two bolls only. A small specimen raised in the garden of Mr. H. C. Tucker, Magistrate and Collector of Gorruckpore;—accompanied by his letter dated April 9th, 1849.

I do myself the pleasure of transmitting a small sample of the acclimated cotton. It was sown in July, and gathered last month. I regret I cannot give you the details you wish. The cotton grew large and strong in my garden, and a large quantity was produced, which I have distributed over the district; but cotton is not grown here, except in small parcels, and I doubt its flourishing except on good garden soil.

GORUCKPOOR: *April 9th.*

Very fine, and of much better staple than D. Benares. Two pods only sent, and which are, apparently, from plants grown in good garden soil. Valued at 5¼*d.* per ℔.

Baugulpore.

F.—1 to 3—seeded cotton. Specimens of cotton raised in the Public Garden at Baugulpore, forwarded by Major Napleton, Honorary Secretary Branch A. and H. Society, with letters under date 30th May and 9th June 1849.

"I hope you received the sample of cotton Lieut. Hyndman, of the 27th Regt. N. I., was good enough to take charge of [Sample F. (1)]. Please tell me if it is equal to the other samples of Mexican cotton received from other quarters by the Parent Society. I have discovered one thing in the cotton crop, *id est,* that the month of May, after a few showers of rain, is the time it yields its proper produce. We have had rain here 3 times. After the first shower the plants threw out new leaves, and seemed quite recovered from its hot weather dried up appearance. Then it came into splendid blossom, and the pods formed in thousands. The crop of cotton under notice is a peculiar one, inasmuch as it was sown out of season, or rather VERY LATE *in the season,* hence its tardiness in coming to perfection. If we have any luck, we hope to gather during the next 10 days, before the rains set in in earnest, a great deal more of this fine cotton. The soil we fixed on for it is rather red in color, sandy and poor, so much so, that we had given up sowing vegetable seeds on it, the produce having always been bad in the ex-

treme. I send a couple of pods of cotton picked yesterday." [Sample F. (2.)]

BAUGULPORE : *30th May,* 1849.

I am forwarding to you by the next Steamer, No. 3 sample of Mexican cotton from our Public Garden, and our Garden Committee will esteem it a great favor if you will have its quality tested, and the result communicated to us.

9th June, 1849.

No. 1. Fibre harsh but strong, staple short. Valued at 3½*d.* per ℔.

No. 2. Of rather better quality than No. 1. Seeds pretty well covered, staple short. Valued at 4*d.* per ℔.

No. 3. Of poorer quality and shorter staple. A later gathering than Nos. 1 and 2. Valued at 3¼*d.* per ℔.

Chota Nagpore.

G.—Samples of "*Kupass*" or seeded cotton, Nos. 1 and 2.	Samples of seeded cotton from Col. J. R. Ouseley, Chota Nagpore, with letters of date 28th November and 29th December 1848, respectively.

The cotton you sent me, with your letter 24th June last, has, I think, done extremely well. It was sowed late in July, in not very fine soil—it was not watered. The height of the bushes is from a yard to a yard and a half—the number of pods on each bush averages (36) thirty-six, of a number counted. The cotton is very white, and staple long and fine. I have sent you some by this day's bhangy uncleaned [G. (1)]. I had a place about 70 yards square sowed, and all the seeds germinated healthily. Dr. Wight calls it Mexican cotton. I am of opinion, that it is a species of cotton that will answer perfectly in this high table-land.

CHOTA NAGPORE : *28th November,* 1848.

I have this day forwarded by dâk bhangy to the address of Mr. W. Seton-Karr, Under-Secretary to the Government, for you—a parcel of Mexican cotton [G. (2)] grown in the Government Experimental Gardens. I think it very fine—it is from Dr. Wight's supply of seed.

CHOTA NAGPORE : *29th December,* 1848.

No. 1.—Sample raised in his own garden. Staple good and strong; good color; less adherent to the seed than most

of the previous specimens. This muster does not resemble the New Orleans cotton in color quite so much as the Banda, but is superior in all other respects to any other of the foregoing musters. Valued at 5½*d.* per ℔.

No. 2.—Raised in the Government Experimental Garden. Quite equal to No. 1 in every way.

No. 3.—These plants were not watered, and the soil was not very fine.

K.—About 20 Bolls. Specimen raised by Mr. T. M. Robinson at Ranchee, Chota Nagpore. See his letter dated 11th January, 1850.

On the 9th instant, I sent you by dawk banghy a small parcel containing cotton, the produce of the seed sent me last year by the Society, from the Coimbatore Farm, an opinion on the quality of which I shall be very pleased to receive. The cotton appears to me to be very strong, and of a fair length of staple. As to the result of the experiment I cannot speak favorably, but this is not owing to any inaptitude of the climate or soil to the crop, but because I was prevented from preparing the land until too late in the season, and last year the rains terminating very suddenly, and unusually early, the plant was deprived of proper moisture at a time critical to its produce. It is, however, thick upon the ground, and after next rains will run up considerably, and I have no doubt yield well. It is on a light sandy soil, well manured with old stable refuse.

RANCHEE: *January* 11*th*, 1850.

Healthy cotton; pods well filled, of good color; staple rather short;—similar to sample G. Valued at 5*d.*, first crop said to have failed for the reasons stated. Sown on a light sandy soil, manured with stable refuse, which, however, cannot be afforded in a field cultivation.

Beerbhoom.

H.—Seeded cotton. Sample raised at Soory by Mr. E. E. Woodcock, Collector of Beerbhoom, accompanied by a letter dated 9th April, 1849.

I have the pleasure of forwarding to-day the sample of Mexican cotton. Four *cottahs* of land were sown with the seed, which was one

seer in weight; the crop will not be fit to be gathered just yet, but as soon as it is, you shall be informed of the out-turn; the soil in which it was sown is called by the people of this part of the country *bulooa.* The plant has had every attention paid to it, it has been well weeded and watered; the past season has been most favorable for the experiment, owing to the almost unprecedented fine weather, little rain, and continued sunshine. The plant was however unfortunately drenched with rain on one occasion in the month of October, from which I do not think that it has ever well recovered, its appearance immediately afterwards was as if it had been blasted, it drooped very much, looked sickly, and the leaves became red, and withered as if they had been singed. My gardener predicts that the crop of the second year will be more abundant than that of the first, and from the same plant. I shall therefore try the experiment.

SOORY: *April 9th,* 1849.

Dirty, discolored and damaged. Staple short. Valued at $2\frac{1}{4}$*d.* per ℔.

This cotton was carefully attended to, weeded and watered, and seemed to have had the finest weather until October 1848, when it was seriously injured by a drenching rain. The second crop is expected to be better than the first.

Note.—No further report has been received, Mr. Woodcock having left the station.

Chittagong.

I.—Samples of seeded and cleaned cotton Nos. 1 and 2. Specimens raised at Chittagong by Messrs. A. Sconce, C. S., and H. Ricketts, C. S., accompanied by a memorandum from the former, dated February, 1849.

Trials made at Chittagong with the cotton seed sent from Madras by Dr. Wight.

This cotton seed was sown by Mr. Ricketts and by myself. On 170 square feet of land, Mr. Ricketts found that 111 plants gave quarter of a seer of seed-cotton, or at the rate of 128 pounds of (uncleaned) cotton to the acre.

My own experiment was more successful. On 650 square feet of land, 260 plants yielded $1\frac{1}{2}$ seer of uncleaned cotton; of which one seer was

of a better sort, and ½ a seer somewhat stained. This seer and a half of uncleaned, yielded 36 tolahs (nearly half a seer) of cleaned cotton.

I have frequently sown foreign cotton seed; but on no occasion have I found the growth of the plants and the out-turn of the produce so successful as in this instance. Throughout the whole season (though the sowing occurred at a disadvantage, that is, sometime after the setting in of the rains) the growth of the plants seemed to correspond with the climate. There was neither a surplus growth of wood nor a premature flowering. And whereas in former experiments with foreign cotton, the boles were eaten through by caterpillars, this crop turned out clean. The rate of the produce of the patch of land sown in my garden is about 2½ maunds the acre of uncleaned cotton.

The sample of *uncleaned* (i. e. seed) cotton, which I now submit, was grown by Mr. Ricketts: the CLEANED sample by myself.

February, 1849. A. SCONCE.

Nos. 1 *and* 2. Good cotton, a fine and strong staple, of healthy color. Fully equal to sample G. raised at Chota Nagpore. Valued at from 5¼*d.* to 5½*d.* per ℔.

Society's Garden—near Calcutta.

J.—Samples of seeded cotton—Nos. 1 & 2. Specimens raised in the Society's Garden, accompanied by memorandum from the Head Gardener, dated 21st July 1849.

Remarks on the cultivation of Mexican cotton plants raised from seed received 27th June 1848, from Dr. R. Wight, of Coimbatore.

A piece of ground measuring 80 feet in length and 70 feet in breadth, that was previously occupied by the cultivation of water-melon, and left fallow for other culture, was on the receipt of the seed ploughed up three times, and prepared, without the application of manure, according to native system; and from four to five seeds were sown on the 1st July, in small holes made with a weeding hook or spade, at the distance of 2 feet apart, North and South, and 3 feet East and West.

The seeds began to germinate on the 5th July. On the 2nd August the grass and weeds were cut with sickle, plants thinned, only leaving a vigorous one, and slightly moulded to strengthen the roots. Blossom appeared on the 28th August, and commenced forming into pods from the 5th September. On the 15th September grass and weed were again cut with sickle, instead of weeding; and on the 1st November gave a

good digging. About this time the plants attained (with exception of few) the height from 3 to 3½ feet, and in diameter from 2½ to 3 feet; and each plant bearing from eight to ten bolls, but almost all attacked by small-winged insects of a red color; which prevented the bolls from coming to perfection. On the 6th December, irrigated the plot without deriving any benefit, therefore removed all the plants on the 24th May 1849; when many of them were from 4 to 5 feet in height, and from 3½ to 4 feet in diameter, each bearing from 12 to 15 small, stunted, worm-eaten bolls. The above plot yielded from the 13th November 1848 to 24th May 1849 only 3½ seers of undivested cotton of inferior quality; picked samples of which accompany.

I must not omit to mention that there is a large mahogany tree near the plot where the experiment was made; which checked the growth of several plants within 20 feet; from experience, I have invariably observed that cultivated shrubs and vegetables (particularly the latter) will not thrive near a large tree. Notwithstanding this drawback, the mahogany tree did not affect the whole crop; the plot of ground on which the trial was made is rich, light and sandy.

JOSEPH D'CRUZ,
Head Gardener.

Of good fair staple, but inferior to samples from Banda, Chota Nagpore and Chittagong. Failed apparently for the reasons stated in the report. Valued at 5*d.* per ℔.

Rajmahal.

J. J.—Sample of seeded cotton. Raised by Mr. J. Pontet, on the skirts of the Rajmahal hills. See his letter dated Bhaugulpore, 2nd June, 1850.

By the *Sutledge* I dispatched a sample of cotton grown in Damun-i-koh or fort of the Rajmahal Hills, it is from the seed you sent me the end 1848, consequently from the second crop. The staple is short, but still very strong and silky; perhaps some experienced member will be able to report upon it, and let me know the result, after that I could wish it forwarded to the Chamber of Commerce at Manchester. My settlers in *this* tract of country call it very superior to any thing they are in the habit of growing, and as this ensuing season I am expecting a large crop, I should wish to know how it is likely to answer for exportation; each village sowed little this last year, and from that I expect to be able to plant a good size field in each.

A second year's crop. Fibre very fine and silky, staple good, clean and of good color. Valued at from 5*d.* to 5¼*d.* per lb.

Cawnpore.

L.—Samples 1—2 and 3. No. 1—Bolls. No. 2—*Kupass.* No. 3—Cleaned cotton.	Samples of bolls, *kupass* and cleaned cotton, raised at Cawnpore by Mr. J. G. Bruce. See letter from Mr. R. Thornton, Assistant Secretary N. W. P., dated 28th June 1850.

To the Secretary Agricultural and Horticultural Society, Calcutta.

Revenue Dept. } SIR,—I am directed by the Hon'ble the Lieutenant-Governor to transmit to you, the accompanying copy of a letter No. 454, from the Collector of Cawnpore, dated the 6th instant, together with the specimens of Mexican seed cotton and cotton-wool produced by Mr. J. G. Bruce from seed received from Coimbatore, in Madras. The Lieutenant-Governor requests that the cotton may be subjected to examination, and that such notice of the experiment, as may appear called for, may be inserted in the Society's Journal.

HEAD QUARTERS: R. THORNTON,
The 28*th June,* 1850. *Asst. Secy. to Govt. N. W. P.*

To J. THORNTON, ESQ., *Secretary to Government, N. W. P., Agra.*

SIR,—At the request of Mr Bruce, Deputy Collector of Cawnpore, I take the liberty of sending for the inspection of his Honor the Lieutenant-Governor, specimens of Mexican seed cotton, and cotton-wool produced by him from seed procured from Coimbatore, through the Horticultural Society in Calcutta.

2nd. I have the less hesitation in sending the cotton, as I have already submitted a specimen to H. H. Bell, Esq., at Agra, who has reported most favorably upon it, an extract of his letter I beg to add. "I think it very desirable, that some should be sent home to show what "quality can be grown in this country, if Mr. Bruce could cultivate "commercially, which is very different from a garden sample, such "cotton yielding four maunds per *pucka beegah,* he will have solved "the problem of the ability of India to compete with America. I do not "think the seed forms more than two-thirds of the weight of the "*kupas,* and if so, Mr. Bruce produces about 547 lbs. of *kupas,* or "182 lbs. of cotton per acre: whereas the American average is said to

" be 125 lbs. clean cotton per acre. I think the sample the best cotton " I have seen in this country."

3rd. I have proposed to the Central Committee that, specimens of this cotton be forwarded to the grand exhibition of the works of Art and Industry in London.

4th. In conclusion I beg to add an extract from Mr. Bruce's letter to my address, relative to the cultivation and out-turn of his experimental crop.

" The seed from Coimbatore did not reach me before the middle of July last year. As a good deal of the season had passed away, and I could not get to Bundelkhund, I merely by way of experiment, and to test the seed, had about a *beegah* of land in my compound sown. From the land being properly manured, ploughed and weeded, the produce turned out very favorable. Each plant had from 50 to 60 bolls or capsules during the 1st or autumn crop, and about the half of that number from the 2nd or spring crop from the same plants.

" I have collected altogether, up to the present time, about 6 maunds of *kupas*, or seed-cotton, and expect from it about 2 maunds of cotton-wool, and 4 maunds of seed. The produce would have been more favorable, but the great quantity of rain which fell here in the month of January, and the frost we had immediately after, injured not only the pods but the plants also."

CAWNPORE, COLLECTOR'S OFFICE: (Sd.) E. H. MORLAND,
The 6th June, 1850. *Collector*.

Bolls large and well filled; *kupass* very clean; the cotton which has been divested of the seed also very clean, and of good color; staple fine. Very beautiful specimens, and fully equal to the Chittagong. Valued at 5½*d.* per lb.

Hooghly.

M.–Samples 1, 2 and 3.
No 1—Cleaned cotton raised by Mr. Barber.
No. 2—Ditto, raised by Mr. Cozer.
No. 3—Ditto, raised by Mr. F. W. Russell.

Samples raised at Chinsurah and Bansbareah. See letter of Mr. F. W. Russell, dated 6th August 1850, with enclosure from Mr. Cozer.

Extract of a letter from F. W. Russell, Esq.

"I send two small packets of Mexican cotton. The larger packet is grown by Mr. Barber, my Head Clerk, the smaller by Mr. Cozer of Bansbaria. I enclose what Mr. Cozer says about cotton: now, if I knew what this is worth, I would set them to plant it. Will you place them before the Committee."

Extract of Mr. Cozer's letter.

"I have now the pleasure to send a small sample of the Mexican cotton from the trees in my garden. I had sown a quantity on the *chur*, but unfortunately the long protracted drought we experienced during the months of April and May fairly scorched the young plant out of the ground, indeed the only remaining trees in my garden had been partially injured, and barely kept alive by watering. I have not the slightest doubt in my mind but that the introduction of this fine cotton into the country could be easily effected. I have shewn some of the cotton to the ryots, who seemed much struck with the peculiar fineness of the texture, its simple mode of cultivation, and the prolific produce of each plant. As I have introduced ryots upon my *churs*, I think I shall have no difficulty in introducing the cultivation of the Mexican in preference to their own *kupass*. The trees in my garden have attained the height of 3 feet, luxuriant in leaf, and full of flowers."

Nos. 1 *and* 2. Both of these samples are like the Chittagong and Cawnpore musters, but rather shorter in staple. Valued at 5*d*. per ℔.

No. 3. The same description of cotton, but badly cleaned and very much discolored from dirt.

Assam.

N.—Samples 1 and 2.
No. 1—seeded cotton.
No. 2—cleaned do.

Raised in Upper Assam from imported American seed, termed "Protective."—See letter from Mr. H. Mornay, Secretary Assam Company, dated 10th Jany. 1850.

I have the pleasure to hand you two samples, one of pod cotton and the other of cotton-wool of the American kind, called 'Protective,' grown in Upper Assam from seed procured from the Society, and shall feel obliged by your submitting them to the Cotton Committee, and favoring me with their Report upon its quality, &c.

Further experiments are being tried on other soils than that upon which this was grown.

Of good staple, good color; bolls fairly filled. Very closely resembling Upland Georgia cotton. Valued at 5¼*d.* per ℔.

In regard to valuations on the above musters we have been governed by the first seventh months' prices of 1849, as being perfectly safe, while the excessive prices at present ruling appear to be caused by actually short production in the United States, and by speculation in consequence. The valuations given are those of a competent party of Manchester experience.

B—C. (No. 4.) G—I. JJ. L and N.

In conclusion, we beg to recommend that the musters noted in the margin be forwarded to the E. I. and China Association, for report thereon.

CALCUTTA: *September,* 1850.

CHARLES HUFFNAGLE.
W. EARLE.

*** A copy of the above Report was sent to Dr. Wight for his information. The following is his acknowledgment of it, in which, it will be observed, he furnishes a few additional interesting particulars regarding his last year's sowings, and forwards samples thereof, which, having been examined by the Society's Committee, a copy of their report is appended.

MY DEAR SIR,—Some days have elapsed since I received your note of the 24th ultimo, but I have been so much engaged and otherwise interrupted in the interval, that I have not found time to look into the matter to which it mainly refers, even though I have, for some time back, been contemplating some rather extended remarks on the subject of our recent cotton-growing operations. These are now delayed, partly, by the want of replies to some enquiries with reference to last season's operations, but mainly in the hope of soon being able to embody some, at least, of the results of the crop now in progress; the earlier sowings of which will, I anticipate, be in crop in the course of 5 or 6 weeks.

I received in due course the last No. of the Journal, for which accept my best thanks. In regard to my contribution I am happy to be enabled to state that my further experience furnishes no ground for alteration; the principles seem perfect but some further experience may be desirable to adapt them to varying localities. Adverting to the concluding note,* I may remark, that the result of my last year's sowings proved on the whole very satisfactory, even though, owing to the lateness of the season at which we commenced operations and the unusually early setting in of the spring rains, we lost a great part of our crop. It was nearly the middle of November before our first sown field was fairly above ground, and it was not until nearly the middle of December before our sowings were completed. To compensate for that disadvantage we had some rather heavy falls of rain in December, and, a most unusual circumstance, a heavy fall in January. These rains, aided by bright, rather warm weather, and two or three waterings (for the whole of my land was susceptible of irrigation) brought on the crop beyond my expectations, and picking, to a considerable extent, was in progress about the end of March. On the 2nd April our spring rains commenced, and from that time until the end of the month we had almost daily showers, sometimes amounting to heavy falls of rain, accompanied by cloudy weather. These clouds and rains proved most injurious to our crops, but notwithstanding they (the crops) were so heavy in the first instance, that we realized on different fields in the course of the season from 300 to 800 ℔s. of *kupas* per acre. The field that yielded the largest produce was an exceedingly dark colored, very light, almost sandy, alluvial loam, usually cultivated as rice fields. But for the injury sustained from the early and continued rains, it is my impression the yield from it would not have been under from 1200 to 1400 ℔s. per acre. The bushes were low, but spreading, and bore, I think, the fullest crop I have ever seen. I have been thus particular in specifying the character of the soil of this field, for the purpose of shewing the description of soil on which the best crop I have ever raised was produced. With a view to solving a question I have often heard mooted, viz.: the exhausting qualities of a cotton crop, I have sown the same field a second time, and side by side with it, an adjoining portion of the same patch of ground which bore a crop of rice last season. Our past experience is unfortunately adverse to the hope of success for this trial, all our former ones having tended to show that the American cotton plant is a very exhausting one. I regret now that I did not forward samples of

* See Vol. vii., p. 29.

my last crop to your Committee for comparison with the Bengal samples, and fear I shall not now be able to send you even a ginned sample, as I believe the whole of our crop is already on its way to the coast for transmission to England. But I shall enquire, and if I can will still send one.

In addition to the New Orleans or Mexican crops, I had one of Sea Island. That I am sorry to say proved nearly a total failure, as out of about 8 acres of land I scarcely obtained 200 lbs. *kupas*. It has however proved enough to preserve the stock, and I have sown again this season, and sent parcels of seed to the coast. I shall dispatch by dawk a packet to you for trial in Bengal, it may perhaps succeed with you though it failed here. It seems a very desirable kind, if possible, to introduce, as a sample from my field was valued in Manchester at 16*d.* per pound.

The quantity of cotton grown on Government account this season is, owing to the many applications for seed, inconsiderable, only about 50 or 60 acres. The natives seem at length to have resolved to give the "Europe" cotton a fair trial, and I this season distributed to neighbouring ryots upwards of 10,000 lbs. of seed, exclusive of about as much more which I sent to a distance. They could not have hit on a more favorable one, so far as it has yet gone, and I now fondly trust all will have good reason to be thankful for having at length so far overcome their perjudice against the new plant as to give it an honest trial. This important change was partly brought about by the appearance of two or three European merchants in the market asking for American cotton, partly by the liberal prices now ruling and partly perhaps by the enormous crop obtained on a small patch of recently cleared forest land, amounting to about 1600 lbs. per acre. Unfortunately for the grower there was only about ⅔ of an acre, but from that small piece of ground upwards of 1000 lbs. of *kupas* was picked.

In reply to your question about the generation of the seed I sent, I believe, I am quite safe in calling it the 9th. It was derived from the seed brought out along with the Planters in 1840. I have once or twice got small supplies since, but somehow it each time got lost among the old stock from observing that it was no improvement on it either as to productiveness or the quality of the produce, and I feel myself warranted in stating that we never grew finer cotton than our last year's sowings produced. We have certainly been careful of it, bestowing the best culture, and sowing only the seed obtained from the first quality of cotton; the result has well repaid our care.

The 280 bales of cotton sold in London from Cochin, were from this establishment, but not all the produce of our farms, indeed the bulk of that batch was native cotton purchased from the ryots and cleaned in our gin-house. I have not yet got accounts of the sale, nor was I aware of its having been sold, until I got your note. The cotton was certainly very good and clean, but the " staple injured," I am not prepared to admit. Indian ginned cotton gives a higher percentage of twist than American ginned, which we never hear of being cut. This fact may I think be accounted for from the circumstance of their working their gins at a speed exceeding ours by at least 20, probably often 50, revolutions in the minute to get quicker through the work.

I have had two of the Mather *churkas* at work for the last month or six weeks. They require much too great a power to drive them. Two men each are unable to keep them steadily at work, alternately driving and feeding, and then they can barely clean from 25 to 30 lbs. of *kupas* a day. With the *churka* I sent you, an old woman or half-grown boy would easily clean from 20 to 25 lbs. in the same time. In a word, I look upon the machine as an utter failure. This is no hurried judgment, but the result of nearly 6 weeks' constant observation ! It is a pity the Society was so hasty in awarding its prize for this machine, which can scarcely compete with the common *churka* as to the quantity of work done in a given time, and the work done by it costs from 40 to 50 per cent. more than when executed by the original simple machine.

You will, I dare say, observe that I have not adverted to the Report of the Cotton Committee. It only reached me yesterday, and I have only as yet glanced at it. So far as a very hurried perusal enables me to judge, it is very good, indeed so good, that I cannot think of doing more at the end of so long a letter, than merely acknowledge it : but I hope in a few days to have occasion to address you again on the subject of cotton growing.

I send by this day's bangy a packet of Sea Island seed, I fear not very good, but the best I have; a sample of ginned Mexican cotton of our last season's crop, one of ryot-grown native *kupas*, and one of the wool taken from it. The *kupas* was taken from a heap lying by a gin at work, the *rué* from the lint room into which it was being driven from the gin. I mention this to show that they are samples of different states of the same thing.

COIMBATORE : *23rd October*, 1850. (Sd.) ROBT. WIGHT.

Report of the Society's Cotton Committee, on the samples forwarded by Dr. Wight in October, 1850.

The ginned Mexican cotton is of good fibre and fair strength, an useful cotton, being flexible and fine, and if well cleaned, and divested of its seed, without injury, would be worth 6½*d.* to 6¾*d.* at present, and usually about 5*d.* to 5¼*d.* per ℔.

The native *kupas (Oopum)* is of short staple though fine, and of good color, parting from the seed with tolerable facility; seeds rather thinly clad with fibre; worth probably 3¾*d.* per ℔. when cleaned. It might fetch more at present, but would not meet with a ready sale, when Surats ruled at 3¼*d.* per ℔.

The ginned or clean *Oopum* cotton is of much the same character, of good fair strength, good color, but of short fibre and rather tender, worth probably about 4*d.* to 4¼*d.* per ℔.

On the Rheeas or Nettle Grasses, and other textile-fibres of Assam. By Major S. F. HANNAY.

My object in giving the annexed list of the fibre-producing plants of Upper Assam is merely with a view to comparisons being made with the fibre-producing plants of other parts of India, but more particularly with those of China, where, under the name of *Mah,* there are four descriptions mentioned by Dr. Macgowan, in his notice of plants yielding the fibre from which the grass-cloth of China is manufactured: published in Part 4, Vol. VI. of the Journal of the A. and H. Society.

That some, if not the whole, of the grass-cloth fibre-producing plants noticed by Dr. Macgowan are to be found amongst those of Upper Assam, I have no doubt myself; and two of them, the "*Dom Rheea*" and "*Bon Rheea,*" appear to me to possess all the fineness, transparency, and

durability of the fibre, which, under the peculiar management of the Chinese as to heckling, spinning or rather joining the ends and no spinning and hot pressing, produces that beautiful cloth generally known as "Chinese grass-cloth." And yet, however well suited under the ordinary process of heckling and spinning, as carried on in England, for the finest cambrics, real "grass-cloth," according to my experience, can be only manufactured, under the Chinese process, as described by Dr. Macgowan.

As the extensive use of the grass-cloth fibre in various manufactures in England makes it however of importance that our fibre-producing plants, and their qualities, should be known, I have given rather a long list, though my observations are confined chiefly to those plants, the produce of which, under cultivation, would as to quantity and quality be of marketable value.

List of Fibre-producing Plants in Upper Assam.

No.	Native Name.	Botanical Name.	Remarks.
1	Dom Rhea,	Urtica,	Produce quantities of a white, transparent and durable fibre.
2	Bon or Jungle Rhea,	Unknown,	
3	Chor Puttah or Surat,	Urtica, tree or Gigantic,	Afford a beautifully white fibre but weak, and by common report not durable.
4	Ditto,	Nettle, stinging,	
5	Ditto Horoo Surat,	Urtica, stinging nettle shrub,	Produces a very fine and strong fibre, much in use.
6	Mesakhee,	Urtica, not stinging,	A small quantity of fibre, its young branches and leaves edible, and has medicinal virtues in certain complaints—is a shrubby tree.
7	Ditto,	Ditto ditto,	Produces a white, strong and durable fibre.
8	Ditto,	Ditto ditto,	By description this must be the Pooah of Sekkhim and Nepaul.
9	Kookur Khoota,	Unknown, small tree,	These are trees and shrubs producing fibre fit for ropes and other purposes.
10	Bon Kupassee,	Ditto, flowering shrub,	
11	Makoree,	Ditto,	
12	Oodal,	Sterculia, tree,	
13	Lugro,	Bauhinia, creeper,	Produces quantity of fine white fibre, not very strong but much used by the Hill tribes.
14	Mamoree Lutah,	Unknown ditto,	Ditto, a thick gut-like fibre used as bow-strings.
15	Bedolee Lutah,	Ditto ditto,	Has a quantity of beautifully fine and transparent fibres.
16	Patallee Koomrah,	Ditto ditto,	Produces fibre of strength but difficult to be removed.*

Dom Rheea, Urtica-nivea, *Linn.*

This appears to be identical with the *Pan* of the Shans, *Kankhoora* of Rungpore, and *Caloee* and *Rami* of Malays: the Chinese here call it "*Pin Mah,*" and the plant from the fibre of which the grass-cloth called "Weng Chung Hapo" is made, the "*Tsheng Mah*" being that from which the cloth called "Tan sa siang" is made; be this as it may, I cannot feel certain that the "*Chu Mah*"* and "*Dom Rheea*" are identical, though much in the cultivation and manipulation of the former as to cutting and peeling, shews them to be of the same species. One thing I have however lately ascertained, that the *Dom Rheea* and *Bon* or Jungle *Rheea* are largely cultivated by the Kakoos of the N. W. Frontier of China, and both raw material and cloth are imported by the Chinese.

Cultivation of the Dom Rheea in Assam.—The sole cultivators of this plant are the Dooms or fishermen, who use it chiefly in making their nets; they cultivate it in very small quantity however, and as the fourth crop is that which bears seed, and they cut it down before the seed is formed, the plant is propagated entirely by dividing the roots. The ground is a small plot close to their huts which they have good opportunities of attending to, and manuring well with ashes and cow-dung, a quantity of which is essential to the proper growth of the plant.

I have mentioned four crops, but as I have now a crop, the fifth, since planting, fit for cutting in February 1851; and I see others belonging to the Dooms in the same state, there will be five crops since planting, or six crops from April to April; the last or cold weather crops cut in February, being considered to produce the strongest fibre. However, as moisture seems so essential to the quick growth of the plant, generally speaking, after the early November or fourth crop, the Dooms allow the cattle free egress into their plots, and

* I can only give my Chinese authority here for noticing that "Chu Mah" is the name of the hemp or flax at a particular stage, that is, "uncleaned" flax or hemp, but of course I cannot vouch for the truth of this.

it is thus kept down until February, when some pains are taken in opening out the roots, heaping up the earth, and manuring them as well as enclosing afresh the plot of ground. The soil from repeated manuring is of course rich, and on this, and a good degree of shade and protection from storms, depends the luxuriance of the crop; which I have seen here eight feet high, and the extracted fibre six feet long. So much attention indeed is given to length of stalk amongst the Kakoos of the Chinese Frontier, that the gardens are walled in (with wattling) like a *Pan* [*Piper Betle*] garden.

From the roots thus dressed up in February, a crop will be cut in April, another in June, another in August, and another early in November; the most luxuriant crop being those of June and August, as naturally receiving the greatest quantity of moisture. The fifth crop takes from early in November to February, to come to maturity. Between the cuttings all that seems necessary is a fresh opening up of the ground around the roots, which in a regular plantation is best done by hoeing between the rows with a spade-shaped *hoe* set in a long handle; the person, as he performs this, going backwards, so as not to step over his work;—in fact, nothing can be more simple than the cultivation of this plant: all that is required being a loose rich soil, and protection to the crop, by a good strong fence. The roots throw up at least 12 shoots when in full bearing; should they increase, and the crops get too thick, the roots require to be separated; and by this means of planting out fresh ground, and new plants from seed, the cultivation can be carried to any extent. It may be as well to mention also in comparison with the *Chu Mah* that the roots produce a crop of stalks the first year, and that a *poorah,* or one acre, would probably produce about 6 maunds of fibre in the twelve months.* But the next stage, that of cutting and

* Major Hannay mentions in a subsequent communication, that he has greatly under-rated the quantity of *Rheea* produced on an acre of land.

removing the fibre from the stalks, is the most difficult and expensive, and is practised by the Dooms as follows:

Cutting and removing the fibre from the stalks.—The stalks are considered fit for cutting when they have become of a brown color, for about six inches above the roots. To cut them the Doom seizes the leaves at the upper end with his left hand, and passing the right hand down to the root, strips off the leaves and cuts the stalk close to the ground. The stalks are made up into bundles, and the scraping off the outer bark commences at the same time, or this operation is deferred until the whole crop of the plot has been cut. . The scraping off of the fibre from each stalk is a very tedious operation, and is performed with a blunt-edged knife; all that is left is the fibre and the woody part of the stalk, which are exposed to a hot sun for 2 or 3 days to dry. The third morning, after having been exposed to the dew for several hours, the fibre is drawn off. This is done by breaking the woody stalk right through, towards the thicker end, and then separating the fibre therefrom; drawing it off slowly, toward the small end, some care being required in giving the same a peculiar twist, so as to draw off as much as possible: having finished with the smaller end, what remains on the thick end of the stalk is pulled off in the same manner. It will be seen that this is a very clumsy way of extracting the fibre, and as far as I can judge 1-5th of the fibre still remains in the stalk, which may be taken off however, at a second breaking; but the Dooms are not particular so long as they get what they require. The hanks of fibre are then separately twisted at the upper end, and tied up in bundles of long hanks of about one seer in weight, if to be kept for sale: as the fibre however thus extracted, is quite ready for the purpose of net making, little or nothing more is done,

What it may be under every possible advantage of cultivation he is at a loss to say, but he thinks it likely to be more than double the quantity stated above.—Eds.

than to open out and prepare the threads for spinning, which is done first by drawing the single hanks several times with a blunt-edged slip of bamboo held in the right hand, this softens and strengthens the fibres, and they are more easily opened out to the required fineness with the fingers and thumb nails, and then made up into small hanks ready for the spinning process; the first stage of which is performed by the women, with the common *takro* or spindle, in general use throughout India, the hanks having been well opened out and spread over the top of a high circular open bamboo frame, set end-ways on the ground. The further operations of spinning the first threads to the requisite thickness and the weaving of the nets is performed by the men. Previous to using the nets they are tanned and dyed in a decoction of the bark of the *(Jamoon)* Syry gum or Uriam, *Andrachne trifoliata*, and if this process is renewed when required, the nets last for two years.

Thus far as regards the use of this plant amongst the fishermen of Assam; it is easy of cultivation, but the subsequent manipulation of the fibre is very rude, tedious and expensive; though, I have reason to believe, that as prepared by the Dooms, it could be purchased at 3 annas a seer, though in small quantity, yet this would increase with a regular demand.

The qualities of the *Rheea* however deserve much more attention than is given to it by the Dooms; a steeping of the fibre for the night in a decoction of the *Arum* plant, with a subsequent washing in clean river water, improves the color and softens the fibre very much, added to which a slight hatcheling on the blunt-edged bamboo, or drawing the single hanks with a piece of coarse cloth held firmly in the right hand, brings it quite in a state of preparation for the English patent hackling machine. In the state of yarn it is easily affected also by the acidulated water of the fruit of the *Garcinea pedunculata*, and thus prepared for taking color

more readily, and when dyed black it has great glossiness, and would, I think, answer well for all kinds of common braiding.

The Indo-Chinese method of separating the fibre from the stalk is however best adapted for this as well as for all the fibre-giving plants, which in Assam come under the name of "*Rheea*," being the quickest, the least expensive, and occasioning little or no loss in the operation:—at the end of this paper I have given a list of the samples of the fibre now sent, and as treated by the various methods mentioned.

2.—*Bon or Jungle Rheea.*—This is a jungle plant, common

Bœhmeria Sp:

in most of our forests, thriving best in the vicinity of water, or running streams: when unmolested it grows to a tree, but by proper management, any quantity of young shoots can be obtained, and as the divided roots afford numerous shoots, and the plant can be propagated by slips as well as by the seed, its cultivation for its fibre might be carried on the same manner as practised in Europe for the *Salix viminalis.* I have shewn the leaves of this plant to the Chinese here, who say the fibre is exported into Southern from Northern China. It is cultivated largely by the Hill tribes on N. W. of Yeuman and by the Singpoos and Dhoanneas of our own N. E. Frontier to a small extent only for a coarse cloth, but chiefly for nets: it is recognised by the Nepaulese as the "Leepceah" of Nepaul. Samples of this fibre have been most favorably reported on by Capt. A. Thompson, [*Journal Agricultural and Horticultural Society of India,* Vol. VI. p. 184.] For those now sent see accompanying list.

Nos. 3 and 4 are tree species of the gigantic or tree nettle

Urtica crenulata, Roxb.

to be found in abundance. They afford a quantity of fine white fibre but apparently of no great strength, and by repute not very lasting, yet I think if taken off the young shoots, it would be found worth the cultivating. Some of the Hill tribes use the fibre for fabricating coarse clothes.

No. 5, and the tree nettles before mentioned, are commonly called "Surat" by the Assamese; this, the "Horoo Surat," *(Urtica heterophylla)* furnishes a quantity of very strong fibre, but not being before acquainted with the plant, the sample I procured was not good, being taken too late in the season. It is recognised by the Chinese as the *Theng Mah*, and is prized for the softness of its flax as well as strength; it is also known to the Bhoteeas as the "Serpah" or "Herpah," and the fibre is extensively used by them in the manufacture of cloth. It is a stinging nettle, with smallish three-pointed leaves, like the *Hibiscus*, and a fluted stalk. The root is a runner, and the flowers are in catkins at the extreme end of the stalk. As the roots can be divided, and the seeds are quick of vegetation, the cultivation of this plant can be carried to any extent.

Nos. 6, 7 and 8 are plants of the nettle species also, but harmless, the first is called *Mesakhee* or *Mejingah*, the others *Mesakhee*. No. 6 has but little fibre and a very rough stem; its young shoots, which are tender and red colored, with the leaves, are edible; and the plant has valuable medicinal properties. No. 7 has much the same habits as the *Bon Rheea*, No. 2; its fibre has also the same character, and is used for the same purposes. It can be cultivated as recommended for No. 2.

No. 8 is either a variety of the above; if not the *Pooah* of Nepaul.* I shall however be able to determine this point hereafter. Nos. 9, 10, 11, 12, are shrubby plants and trees, affording quantities of fibre well adapted, in the raw state, for ropes and fastenings of all kinds, and some of them with proper management in taking off the bark, would, I think, afford a good flax. No. 12 has been reported on by Capt. A. Thompson. [*Journal Agricultural and Horticultural Society*, Vol. VI. p. 139.]

* For notices regarding the *Pooah* of Nepaul *(Bœhmeria frutescens*, Don.) see Vol. VI. of this Journal, pp. 135 and 240.—Eds.

Nos. 13, 14, 15, 16 are creepers and climbers; the *Bauhinia (B. scandens?)* is well known as affording a quantity of white serviceable fibre, but not equal to the *Rheea:* the fibre is extracted from the inner bark by subjecting the stem to almost a roasting heat over the fire.

No. 14 has a strong fibre, like fishing gut, and is used for bow-strings. No. 15 belongs to a class of creepers which run along the ground and upon the high reed jungle, on the banks of rivers, and in all low places, the flowers are in immense clusters, small, and of a purple color. There is a disagreeable odour from the plant when touched, and elephants are vastly fond of it. It contains a quantity of beautifully fine transparent fibre, of short staple, but when spun into thread is strong. There is difficulty in extracting the fibre, however, and it has only as yet been used for fishing lines.*

No. 16, *Patallee Koomrah.* I have always considered this gigantic climber as the "*Convolvulus Burmah;*" however, as it produces a good deal of fibre deeply seated, clusters of fine purple flowers, and an immensely large root, which is edible† (though it has a 7-pointed leaf) I am inclined to think it is the same, or a nearly allied species, of the *Koh* of China noticed by Dr. Macgowan.

In conclusion, I may say that I could give the names of many other fibre-producing plants, but at present I think this is unnecessary. We possess at least four manageable fibre-producing plants, which, under cultivation, would be a valuable addition to the other productions of the Assam soil and climate. I have no doubt myself that in a little time, with a demand, we should be able to get any quantity of the *Dom Rheea* prepared in the dry way, which I fancy as a flax would

* While this paper is passing through the press, the Society has received some beautiful specimens of this fibre *(Bedolee lutah),* and one of No. 13 *(Lugro),* from Major Hannay.—Eds.

† I got a plant of this last year with a root 4½ feet in circumference.

suit the English market equally well with that imported from China, and prepared in the wet way as described by Dr. Macgowan.

During the coming season I hope to be able to send samples of the fibres of all the nettles, with specimens of leaves and flowers of the different plants.

List of samples of Fibre sent.

No. 1. *Dom Rheea. Urtica Nivea,* prepared according to the practice of the fishermen in Assam.

,, Prepared by the hand for spinning according to the practice of the Dooms in Assam.

No. 2. A portion of No. 1 steeped, and partially bleached in the acidulated water of the *Garcinia* fruit.

No. 3. *Urtica Nivea* or *Rheea* nettle crop. Fibre prepared according to Indo-Chinese method.

,, Washed and steeped in a decoction of the *Garcinia* fruit.

,, Taw or waste of ditto.

No. 4. *Urtica Nivea,* a portion of No. 3 heckled and opened out, Chinese method.

No. 5. *Urtica* —— ? *Bon* or Jungle *Rheea* "Leepeeah of Nepaul" sample of fibre.

,, Heckled in the Indo-Chinese fashion, has been macerated in the water of the "*Arum.*"

,, Partially bleached in a decoction of *Garcinia.*

No. 6. *Urtica,* Horoo Surat or stinging nettle of Assam, Serpah of Bhotan "Theng Mah" of Chinese, sample of fibre—(2 samples.)

No. 7. *Urtica Nivea, Dom Rheea* yarn, spun by Dooms.

No. 8. Ditto ditto ditto. Slightly bleached in acidulated water of *Garcinia.*

Report regarding the introduction of Carolina seed paddy into the Province of Arracan.

(Communicated by the Government of Bengal.)

To J. P. Grant, Esq.,

Secretary to the Government of Bengal.

Revenue. Sir,—With reference to letter No. 137, dated 28th June 1848, from the Under-Secretary to the Government of Bengal, announcing to my predecessor, Major Bogle, that the Government had been pleased to import from America, and send to this province, a supply of Carolina seed paddy, I have now the honor to report, for the information of the Hon'ble the Deputy Governor of Bengal, what has been done in this important matter up to the present date.

2. My predecessor, Major Bogle, on the 18th of July 1848, caused the seed paddy to be distributed throughout the district of Akyab: accounts were made of the quantity distributed, which amounts to 1,774 Arracanese baskets, or about 400 maunds, and by the statements received from the Keoks, or Government revenue officers in charge of the various circles of the Akyab district, this quantity was planted during that season in 95 doons or about 617 acres of land, and yielded a crop of 3,027 baskets or 681 maunds of paddy; an average crop of native paddy, on the same area would have yielded about 50,000 baskets or 11,250 maunds of paddy. This great deficiency of produce, I have reason to believe, from close enquiry I have made since my arrival here, resulted chiefly from the seed having been sown in land where the water lies deep, this description of land is that which suits best the native kinds of paddy, but I think it probable that the Carolina will thrive best where the water is never more than from two to three inches deep, and which can be occasionally drained off altogether: a good deal of this paddy was also destroyed by an inundation of salt water, which affected a considerable portion of the Akyab district,

the scarcity of produce may perhaps also partly be attributed to the seed not being a native to this climate.

3. After the departure of my predecessor, Major Bogle, in October last, to join his regiment on the Punjab frontier, due arrangements for the sowing of the Carolina paddy in the next season, or during June and July 1849, do not appear to have been made. Shortly after my arrival here, on the 17th of the latter month, my attention was called to this subject. On inquiry, I found that the people were prejudiced against the Carolina paddy on account of the scanty crops they had obtained from it, and many persons objected to it on account of the alleged difficulty of thrashing it. They have stated to me personally that the grain is not easily separated from the stalk, by the ordinary process of treading out with buffaloes. I found however that some seed obtained from the crop of 1848 had been sown by a few people, and although it was rather late in the season, some more was sown during the latter end of July, and beginning of August last.

4. I have now before me a detailed return made under the direction of Mr. W. J. Longmore, the late Officiating Principal Assistant, in charge of this district, showing the name of each person who has sown Carolina paddy seed during the present season, together with the quantity of seed, and the extent of land sown. The following is the result:

Quantity of seed used, ..	820 baskets, or maunds 184.
Quantity of land sown, ..	44 doons, or acres 275.

I trust that, from the people having become aware that this paddy is not likely to thrive where water lies deep, they who have sown it this year have been careful to plant it in what is called "high" or "middling" ground. The Keoks also state that the crops of this paddy are generally coming on well, and some report that it is in as forward and healthy a state as the Arracanese paddy in the vicinity sown about the same time.

5. I should wish however to test the fact of the returns of sowing being accurate, and to attain this object I propose deputing some trustworthy person to go to the different places, or at all events to a majority of them and ascertain if the persons named in the lists have actually cultivated Carolina paddy in the quantity stated; as the present crop will not be reaped before December (except in a few places where early sowings were made of the Carolina paddy which it appears ripens much faster than the native kinds) there will be ample time to view the crops on the grounds. As I think however it would be desirable to employ a person for this purpose totally unconnected with the Revenue Department, I solicit the sanction of Government to the expenditure of a sum not exceeding one hundred rupees for this purpose. After such efforts have been made to introduce this paddy, it is most desirable to ascertain whether the seed has been preserved and sown unmixed with other varieties; I shall pay especial attention to this point in the next sowing season.

I have the honor to be, &c.,

(Sd.) A. P. PHAYRE,

AKYAB: 24*th Oct.* 1849. *Commissioner of Arracan.*

Remarks on the Agricultural capabilities of the District of Leia, in the Punjaub. By Capt. G. E. HOLLINGS.

I shall feel obliged by your assuring the Society, that although I have not been so good or so frequent a correspondent as I might have been, I have not during my residence at Leia been altogether an idle or useless Member. I was unwilling to communicate my opinion of the agricultural value or resources of this district before I had an opportunity of satisfying myself of its capabilities, but I may truly assert, that I have in practice devoted as much time and attention as I possibly could to the subjects in which the Society are

most particularly interested, and I trust that future communications will prove that I am sincere in wishing to promote, so far as may be in my power, the great cause of agricultural progress.

Comparatively, my public position at Leia is somewhat different, with reference to agriculture, to that I occupied at Lucknow. At the latter station I was an individual amateur, anxious to do all in my power to assist; at Leia I have in some degree the power to originate and direct experiments, the successful result of which must be beneficial to the people, and I am glad to say that the population generally are so well disposed to devote themselves to the improvement of their own "status," and so little inclined from any natural or artificial prejudices to offer objection to the introduction of new products, the cultivation of which is likely to be remunerative, that I have no doubt of seeing at no distant period the general introduction of every species of fruit, flower, or vegetable that has hitherto been found conducive to the extension of commerce, the amelioration of vegetable esculents, or the delight of the florist.

I will notice each subject in the above order.

1st. The extension of commerce.—This is essentially an agricultural district, almost every article is produced to an extent beyond the demands of the inhabitants. To the north of the district, under the Salt Range, in the Tuhseel of Kutchee or Kokree, the cereal grains are produced in great perfection; a large portion of the products are exported to Lahore and the intermediate districts: the wheat of Murwut, a trans-Indus province, is considered of very superior quality, and a large quantity is annually exported, passing through the Kutchee district in transit, but this does not interfere with or affect the local market. It may be right to mention that the Board of Administration have sanctioned very light assessments in this direction, and they have desired that every care should be taken to prevent the real landholder being oppressed by

Government demands, or his being allowed to fall into the power of the lenders of money; the consequence is, that as every farmer knows it to be to his interest to keep the engagement he enters into with the State, very few defalcations occur, nor has there yet been any necessity for supporting the farmers with advances from the Treasury. I may conscientiously express my conviction that such advances are not necessary. We have heard of and know the results of certain experiments for extending the cultivation of cotton in the Bombay territory and throughout Bundlecund, based on the system of advances and expensive establishments, which have failed. My experience is limited, but it affords some instances of success when the only encouragement afforded to the cultivator was a supply of seed, with the drawback that, in the event of success, a heavier rateable assessment would be taken by the Government. The Branch Society at Lucknow introduced the cultivation of the sugar-cane in the vicinity of the capital; the finer kinds, the consumption of which was patronised by the court and nobles, bore a high price in the market, and the growers paid in proportion for their lands. In the districts bordering on our frontier towards Shahjehanpoor the cane was cultivated for the purpose of selling the products to foreign merchants, the ryots received no advances, but found it to their advantage to grow the cane. I have been told Rajah Goolab Sing introduced the cultivation of the sugar-cane in the Baiwul and Pudana districts, when he had charge of it, with a distinct understanding that a higher rate of assessment per beegah was to be paid for all land on which it was grown: that and the neighbouring districts now export thousands of maunds of raw sugar.

There were restrictions in the Leia district regarding the cultivation of productions that had a commercial value, but they have all been removed, and the increase in the cultivation of indigo, cotton and sugar is already perceptible, and will be enormous.

The Affghan merchants purchase the indigo. Sugar is principally cultivated to the south of Leia, and the surplus product finds a ready sale in the large neighbouring towns of Mooltan and Derah Ghazee Khan. Almost all the cotton that is now grown in the district is used for home consumption; it is exported from the south to the north in comparatively small quantities, but I believe that a very small portion is yet available for export, beyond the limits of the district: the case will be different a few years hence.

The above remarks may be more lengthy than the subject required, but I wished to show why I think that the production of any staple may be better encouraged by a generally moderate assessment, which admits of every individual cultivating that which he considers most remunerative, than by forming as it were the cultivation of a particular product by offering apparently tempting advantages to the farmer in the shape of money advances.

From what I have written, you will not be surprised at the expression of my opinion, that if the liberal principle now adopted with regard to the land revenue is continued, this district of Leia will hereafter produce year by year an increasing quantity of indigo, sugar and cotton in excess of local demands, for exportation. Tobacco will, I think, be added to the list, and there is every reason to suppose that vegetable soda can be produced to any extent. It is impossible now to form any opinion as to the range and degree of perfection that may be obtained in the vegetable products of this district. The whole extent of the western boundary is enriched by the inundation of the waters of the Indus, and the command of water throughout the year. To the eastward there is an equal command of water from wells, and the soil is enriched by the swollen waters of the Jhelum. The northern boundary is under the Salt Range. Science might secure an abundant supply of fresh water, whilst nature gives with the greatest prodigality every kind of mineral manure. To the

southward the comparative approximation of the waters of the Indus and Chenab, with the assistance of rudely constructed canals, affords continual moisture, through the influence of which the deposits of sand and clay are worked up into rich loams in which all vegetables seem to attain great perfection.

Over the lands in the vicinity of the Punjnund, a name apparently derived from the meeting of the five rivers near Mithunkote, the date tree appears to thrive admirably; it would seem that the soil is very congenial to its growth. I have been surprised at the depth of the roots of a seedling date when the first leaf appears above the ground. When we see the slender and graceful tree attaining so great a height, and know that its age amounts to hundreds of years, we must conclude that the depth of its roots bears some proportion to its height, and that more is necessary for its maintenance in position than the sandy soil from which it appears to spring. A very little examination convinces us of the great depth to which its roots strike. In a section of the soil we should find stiff clay below the sand, next a formation approaching to kunkur, and then perhaps kunkur or some hard substance; the *purchase* which the roots of the date tree have, depend on the substratum of clay. I write as if I understood the subject on which I pretend to treat, but it is not my intention to convey any such idea; I only describe what I have seen, according to my limited knowledge and understanding. When I mention facts they may be depended on, when I express opinions they may be received "quantum valeant," according to their intrinsic value.

I had almost forgotten to mention, in support of my opinion, that peculiar Government protection is not necessary to promote the introduction of a vegetable product, an instance that has occurred in my own district. A few years ago a wanderer from Oude arrived at Leia and made up his mind to settle in the neighbourhood; he had brought with him a few seers of rice seed, and was allowed to sow it on some

land, exposed to the periodical inundatiôn, which was not then cultivated; the result was a splendid return. A large quantity of seed was reserved for sowing, and I have seen hundreds, I might say thousands, of beegahs covered with as good a crop as a reasonable farmer would expect; the stacks of rice are larger than those I have seen of any other grain.

Matters that, from coming under our daily notice, seem of little consequence to us, may include the particular points on which the Society would be glad to obtain information; for instance, it appears natural that the first question asked would be—What are the indigenous products of the district, and what proportion, as regards quality, do they bear to similar products in Hindostan? The next enquiry would probably be regarding the course of the seasons and their apparent effects on cultivation? The third would express a desire to obtain information regarding the nature and characteristics of the different soils—methods of cultivation, &c. the proportion of seed to produce, what manures are used, how often lands are watered and weeded, average proportion between expenditure and value of produce, price of cattle, cost of constructing wells, the implements of agriculture, the nature and extent of taxation, the general condition of the agriculturist? In the anticipation of such questions being asked, I have prepared the accompanying tables which refer to the district of Leia Proper, they will I trust afford much information that will be interesting to those Members of the Society who have joined it for its *cause*, independent of the advantages which they receive in the shape of seeds and a copy of the Journal in exchange for their pecuniary contributions.

With regard to the introduction of new products I must commence with regretting that I could not get a supply of potatoes for planting this year; the demand was so great that at one time they were selling at the rate of forty rupees a maund at Lahore, a price quite beyond my means, and therefore I abandoned the attempt to introduce them this year.

I hope to be more fortunate next year. From the seeds sent to me by the Society; by the ever-obliging Manager of the Saharunpore Garden; by a kind friend at Nagpoor, who has always been most liberal in encouraging and assisting me in my endeavours to be an useful Member of the Society, and by the Secretary of the Lucknow Society, I have been able to introduce almost all the European vegetables and flowers, which will, I am certain, attain, from the promise they now afford, great perfection.

I was indebted to Mr. Carne, the Collector of Salt Customs, for a large supply of oat seeds, which will, I am convinced, prove a valuable addition to the productions of the district.

It is curious, that although the Affghan merchants derive the greatest advantage from the cultivation of lucerne and clover in the hills, they have never thought of bringing seeds to this part of Asia. I have introduced these products, and feel assured they will be generally cultivated. Last year I got some geraniums, sweet briar, white roses, carnations, and other plants from Mussoorie, they were sent to me by a friend who takes a great interest in floriculture. I regret to say that during my absence on duty from the station the greater portion was destroyed by frost. I have, however, a few plants of carnation, white rose, and one shrub bearing a beautiful white flower, which I hope have taken root in the soil. This year my success has passed my utmost expectations, but I will defer giving an account until the tender seedlings have outlived the frosts.

I have found that, by plunging the pots into a bed composed of fresh manure from the stable, all seeds germinate, and at this present moment, I have promising plants of geranium, violet, heartsease, dahlia, lupins, and a long catalogue of others "quod describere longum est;" the *convolvulus* and *ipomea* are in magnificent bloom. I have been promised an extensive supply of bulbs and fruit trees from Cashmere, you may imagine that the arrival is expected

with considerable anxiety. The plant called in Hindostan the *sook dursun*, of the lily kind, gives in this country the handsomest blossom I have seen in India. I could send you bulbs, but the transport would be expensive.

Melons of all kinds thrive well here, and if the Society wished I could send seeds of both the musk and water-melon.

I shall always be happy to make myself useful. It may be worthy of consideration whether seeds from European or tropical climates, that had been acclimated on the Indus, might not be as valuable as Australian, Cape or American ones: if any Members of the Society agree with me in opinion that the experiment would be worth trying, I shall be happy to send a supply of such seeds as I may be able to collect to you, or any Members of the Society, who would agree to pay the expence of transit by banghy.

I shall write to Lucknow, for some plants of arrow-root, tapioca and vine cuttings, as also a supply of different kinds of sugar-cane, and shall feel obliged by your mentioning to the Society that these articles would be very acceptable if they could be conveyed at a moderate expence. The Society might, I think, solicit the Government for permission to send the first supplies to any Member who may be publicly employed in a new district, free of charge. If circumstances admitted of it, the Bombay Society could command a more convenient and rapid method of conveyance than the Calcutta one. Whatever benefit the people may derive from the exertions of active Members of such Societies, there cannot be a doubt that, from the improvement of staple products and introduction of new ones, a great degree of certainty as to the collection of the Government revenue is ensured, and independent of all moral considerations with regard to the social advancement of the agricultural population, no advantage can be derived by any one from such causes without the Government participating in it.

If the development of the mineral resources of the Punjab, as may reasonably be expected, attracts population, every improvement in vegetable products will be of great value. It is, I think, to be regretted that a competent and zealous botanist was not appointed with the Commission; let us hope that that branch of scientific enquiry will at no distant period be attended to.

As the *tables* promised in the body of this epistle are not quite ready, I will not delay the despatch of this letter, as from the kind attention paid to my former communications I may justly expect that this may be interesting to some of the Members of the Society.

Leia: 21*st December,* 1850.

Correspondence regarding the Tapioca plant of Assam.

In June 1850, Major Jenkins, Agent to the Governor General on the N. E. Frontier, forwarded to the Society, specimens of tapioca prepared by Major S. F. Hannay at Deebroghur, in Upper Assam, from the "*Jatropha*" plant. The specimens were accompanied by a letter from Major Hannay to the address of Major Jenkins, dated Deebroghur, 15th June, descriptive of the process of preparation, of which the following is an extract:—

"Clearing out a garden fence of the "*Jatropha*" plant put me in mind of having, last year, sent down to the Agricultural and Horticultural Society, two bottles of arrow-root, or tapioca made from the flour of the root, but through some oversight they were forgotten; I have now however the pleasure to send two bottles of the same which, I think, it may be as well to test with reference to its value in comparison with the arrow-root and tapioca of commerce, and this may be best done perhaps by sending it to the Horticultural and Agricultural Society.

"The plant is very common, and Mr. Masters calls it the sweet "*Manihot;*" that it does not contain the poisonous qualities of the South American plant, we may be sure from the fact of the root being sold as a yam, and the Assamese eat it uncooked; they call it the "*Hemaloo Aloo,*" the leaves having some resemblance to those of the "*Simul*" (*Heemool*) cotton tree (*Bombax heptaphyllum*).

"The flour is washed out and prepared in the same manner as in preparing the common arrow-root. Ure says that in making tapioca hot iron plates are used to grain it; and this probably makes it keep better in a damp climate;—this now sent, has been dried in the sun-heat only, and it breaks up of itself as seen in the large bottle.

"The flour may be treated in the same way as the common arrow-root, but I think it requires boiling or simmering as the cookery book says; it forms a fine jelly; from having been made in rainy and damp weather it may not be so white, as it could be made in the dry season. October is the proper month for collecting the roots and preparing the flour."

In acknowledging the receipt of the above, Major Jenkins was requested to obtain specimens of the plant, with flower and seeds, with the view of ascertaining the species. It was also brought to his notice,—"that Mr. Masters makes no mention of this plant, in particular, in his "Memoir of some of the Natural Productions of Angami Naga Hills, and other parts of Upper Assam;" (Journal A. and H. Society, Vol. VI. p. 34) but that in his paper previously published (Vol. IV. p. 197) entitled "Botanical Observations in Upper Assam," he observes '*Janipha manihot? Gash-aloo,* is often used for hedges, and is not unfrequent in the jungles near the hills; it does not appear to have any poisonous qualities in a green state as the Assamese eat the root eagerly when raw.' This may be" —the writer goes on to observe—"Major Hannay's '*Hemaloo-aloo*' which Mr. Masters calls 'the sweet *Manihot,*' and the root of which, Major Hannay states, is eaten uncooked."

Referring to this communication, Major Jenkins, in a letter dated Gowhatti, 31st August, observes: "The changes of name in the *Cassava* plant has caused a good deal of confusion probably in identifying the plant; it is now called, according to Lindley's last edition of the Vegetable Kingdom, *Manihot utilissima*—this was the *Jatropha manihot;* the word *Janipha* is obsolete as the name of a genus. Mr. Masters' and Major Hannay's is the same plant, it grows all over Assam, is constantly used for hedge rows, but after 2 or 3 years the root is dug up to be eaten as yam, and it is certainly quite harmless, as it is eaten raw. I fear I could not send you the flowers, it seldom or never flowers, I at least do not remember to have seen it in flower, though I have always had some of the plants in my garden hedges.

"I got from Dr. Wallich once some plants of imported *Cassava,* as he told me, from the West Indies, but I found no difference in them from ours, except that the young branches have reddish twigs, but I am not certain that ours has not, and I know that Wallich's plant is dispersed about this place, and is not distinguished by the Natives from the indigenous "*Gash Aloo.*" It is possible ours may be the *Manihot Aipi* of the eastward, if it be different from the *Manihot utilissima.*

"An old Assamese gentleman, our Principal Sudder Ameen, tells me he never saw the flower nor heard of it. I may add, that I have seen the very same plant in Arracan."

In a third communication, under date the 25th September, Major Jenkins forwards a note to his address from Mr. Masters with the following extract from Ainslie's *Materia Medica* :—

Tapioca.—Jatropha Manihot (Lin.)

Cl. and Ord. *Monœcia Monadelphia.*

Having found that the *Jatropha manihot* grew in great abundance and luxuriance in many parts of Lower India, I, some months before leaving that country, in 1814, attempted to make tapioca from the root, and per-

fectly succeeded; the first, I believe, that ever was made in our Indian dominions. An account of the method of preparing it was published in the *Madras Courier*, under date 13th of March, 1813. An amylum, or starch, is first to be obtained from the fresh root, which starch, to form it into tapioca, must be sprinkled with a little water, and then boiled in steam; it is in this way converted into viscid irregular masses, which are to be dried in the sun till they have become quite hard, and then may be broken into small grains for use. Tapioca is an admirable diet for the sick, being at once light, extremely pleasant to the taste, and nourishing; it may be either simply boiled in water, like sago, and sweetened with sugar, or it may be boiled in milk.

The tapioca plant is called in Tamool *mārávullie*, and from the circumstance of its having no Sanscrit, Arabic, or Persian name, I am led to think, that it is not a native of Hindoostan, but was probably brought hither, many years ago, by the Portuguese; it would seem to be the variety called in the West Indies *sweet cassada*. Browne says of it, in his History of Jamaica (p. 350): "Foliis palmatis, lobis incertis, radice oblonga funiculo valido per centrum ducto carne nivea." The root of this sort is considered as the most safe to eat, indeed, it may be taken raw, or roasted like a potatoe, without the least danger; it is called by the Tamools *mārŭvŭlliekalung*, and is much prized by them. The *Jatropha manihot*, I find, grows also in Ceylon; and the late Dr. White, of the Bombay establishment, informed me, that dried, it is exported as an article of trade from the Mosambique to the ports of Goa and Damaun: to Ceylon, it was first brought from the Isle of France, in 1786 or 1787, by Governor Van de Graaf.* Southey, in his "History of Brazil," tells us, that with the root of the *mandioc*, as he calls it, is prepared by fermentation an intoxicating liquor (pp. 232, 233, 234). The excellent Baron de Humboldt says, that in New Spain a sauce and soy are made from the bitter *cassava, juca amarga*, the juice rendered innocent by boiling. The *Jatropha manihot* is the *juca* of the Mexicans, in whose country it has been cultivated from the most remote antiquity; they distinguish the two kinds carefully, and separate them in their fields, calling the bitter *juca amarga* and the other *juca dolce*: the first kind they render innocent by means of fire. *Browne* observes, in his History of Jamaica, that the variety of the plant which yields the bitter root, has "foliis palmatis pendadactylibus, radice conico oblonga, carne sublacteæ" (p. 349). It is said to contain the deadly poison termed *manipuera*, which is the fresh juice of it, and is, therefore, always carefully

* See Asiatic Annual Register, for 1805, vol. vii. p. 87.

squeezed out, after which the root is as safe to eat as that of the other variety. Before concluding all I have to say regarding this valuable article, I must observe, that the flour or meal of the sweet *cassava* root makes good biscuit and bread; to prepare which the root is to be first well soaked in fresh water, and subsequently dried in the sun, and then pounded into flour for use. Bread so made, Baron de Humboldt observes, is considered by the inhabitants of New Spain as particularly nutritious.*

Four species of *Jatropha* were growing in the Botanical Garden of Calcutta in 1814: *manihot, multifida, curcas* and *grandiflora.* Three species grow in Ceylon, where our article is called *mangyokka* (Cyng.).

Dr. Ainslie's plant I suppose to be the same as the *Gash Aloo* (tree potatoe) of Upper Assam, (Journal Agricultural and Horticultural Society of India, Vol. IV. p. 210, No. 320) and is probably Mr. Piddington's *Jatropha glauca.* I have no description of the true *J. Manihot*, but the Assam plant appeared to me like what formerly went by that name, in the H. C. Botanic Garden. The leaves are generally, if not always, seven-parted and glaucous underneath. I have never observed the plant in flower or fruit. Dr. Roxburgh says the *J. Manihot* was introduced into the H. C. Botanic Garden before 1794, and it may have remained to this day without any one having examined whether it be the true *J. Manihot* or not. Dr. Falconer can at once tell if the plant is in the Garden or not, and if the leaves which I shall send are of the same species or not.

(Signed) J. W. Masters.

In a fourth, and last letter, dated 21st October, Major Jenkins submits specimens of leaves of the "*Gash Aloo*" received from Mr. Masters, and which Mr. M. informs him have been compared with the plant *(Heemaloo)* from which Major Hannay prepared his tapioca, and are found to be identical. Major Jenkins adds;—"The flower has not been seen by any one that we can learn, but from the information

* See Baron de Humboldt's Political Essay on New Spain, vol. ii. p. 435. English trans.



collected by Mr. Masters, which I sent you in a former note, this is, there can be no doubt, the sweet *Cassava* of South America. There is no barren waste or hill land about us in which this plant does not thrive; the root increases in size according to the period it is allowed to grow, from one to 3 or 4 years; and I suppose an ordinary-sized root may weigh from 10 to 20 seers, perhaps still more. I have never seen it cultivated in fields or plots, but it appears to be just stuck in the hedges (for which whilst it grows it forms a useful post) and when wanted, or at maturity, it is dug out. I think it is probable, as stated in Dr. Ainslie's work, that the plant is not indigenous to India. I do not recollect, at least, ever seeing it in a true forest or jungle."

The leaves submitted by Mr. Masters, were referred to Dr. Falconer who states that "they belong, as indicated on the label, to *Janipha Manihot.* The Indian plant has the palmately 5-7 parted leaves, glaucous underneath, of the *Jatropha Manihot* or *Janipha Manihot,* and I believe it to be merely a variety yielding the "sweet *Cassada.*" The variety yielding the "bitter *Cassada*" we do not appear to have in India. The people of Bengal call the plant "*Rotee aloo,*" and eat it raw without any bad effects. The plant has not flowered in the Botanic Garden, at any rate there is no record of it.

I have examined also the product in the two bottles, and it appears to be good tapioca."

*** With the view of supplying means of comparison to residents in other parts of India, it has been thought desirable to introduce in this place the figure of the tapioca plant, *Janipha Manihot.* Tab. 3071 of Vol. 58 of the *Botanical Magazine,* together with Sir Wm. Hooker's description of the plant.

Janipha Manihot.—Eatable-rooted Physic-Nut, Bitter Cassada, Manioc, or Tapioca.

Class and Order. Monœcia Decandria. (Nat. Ord. Euphorbiaceæ.)
Generic Character.

MASC. *Cal.* nullus. *Cor.* campanulata, quinquefida. *Stam.* 10, libera. *Nectarium* 10-radiatum. Fœm. *Cal.* nullus. *Cor.* 5-partita. *Stigma* amplum, carnosum, cristatum multifidum. *Capsula* ovata, apice acutiuscula, tricocca. *Pohl,* (sub Manihot.)

Specific Character and Synonyms.

Janipha Manihot;* foliis palmatis 5—7-partitis glabris subtus glaucis, laciniis lanceolatis integerrimis, floribus racemosis.

Janipha Manihot. Humb. et Kunth, Nov. Gen. v. 2, *p.* 108. *Spreng. Syst. Veget. v.* 3, *p.* 77.

Manihot utilissima. *Pohl, Pl. Brasil, Icon. v.* 1, *p.* 32, *t.* 24.

Jatropha Manihot. Linn. Sp. Pl. p. 1428. *Ait. Hort. Kew. ed.* 2. *v.* 5, *p.* 330. *Willd. Sp. Pl. v.* 4, *p.* 562. *Lunan, Hort. Jamaic. v.* 1, *p.* 161.

Jatropha. n. 5. *Brown, Jam. p.* 350.

Ricinus minor, &c. *Sloane, Jam. v.* 1, *p.* 130, *t.* 85, *et t.* 141, *f.* 1. (root) *et vol.* 2. *App. t.* 6. *f.* 1.

Manihot Theveti, Youcca, et *Cassavi. Bauh. Hist. v.* 2, *p.* 794.

DESCR. " This has an oblong, tuberous root, as big as one's fist, having some fibres drawing its nourishment, and being full of a wheyish, venomous juice. The *stalks* are white, crooked, brittle, having a very large pith, and several knobs sticking out on every side like warts, being the remains of the footstalks of the leaves, which have dropped off. The plant usually rises six to seven feet high, and has a smooth, white *bark;* the *branches,* which come out on every side towards the top, are crooked, and have, on every side, near their tops, leaves, irregularly placed" (Sloane), on long, terete *petioles,* broadly cordate in their outline, divided nearly to their base into five spreading, lanceolate, entire segments, attenuated at both extremities, dark green above, pale glaucous beneath; the *midrib* strong, prominent below, and there yellowish-red: from it there branch off several oblique veins, connected by lesser transverse ones. *Stipules* small, lanceolate, acuminate, caducous. *Panicles* or

* *Janipha* is an Indian name, applied to another species of this genus, the *Jatropha Janipha* of Linnæus. *Manihot* is equally an Indian appellation, by which the various kinds are known in Brazil. The genus, therefore, being separated from *Jatropha,* the generic name of *Manihot* would have been more properly applied to it, as has already been done by Plumier, Tournifort, Adanson, and, subsequently, by Pohl. *Janipha* was, however, established by Kunth, and has been sanctioned by Jussieu, Sprengel, and the majority of Botanists.

compound racemes, axillary and terminal, four to five inches long, bearing sometimes all male or all female flowers, at other times these are mixed on the same peduncle. *Pedicles* with small, subulate, bracteas at their base. *Male flower* smaller than the female. *Perianth* single, purplish on the outside, fulvous-brown within, cut about half-way down into five spreading segments. In the centre of the flower is an orange-colored, fleshy, ten-rayed *nectary*, and the ten *stamens* alternate with its lobes or rays. *Filaments* shorter than the perianth, white, filiform, free. *Anthers* linear-oblong, yellow. *Pollen* globular, yellow. *Female flower* of the same color as the male, deeply five-partite, the laciniæ lanceolato-ovate, spreading. *Nectary* an annular, orange-colored gland or ring, in which the purple, ovate, furrowed *germen* is imbedded: *Style* short: *Stigmas* three, reflexed, furrowed, and plaited, white. *Capsule* ovate, trigonous, tricoccous. *Seeds* elliptical, black, shining, with a thick, fleshy seed-stalk.

We learn from the Hortus Kewensis, that the *Cassava* has been cultivated in the stoves of Great Britain ever since the year 1739, having been introduced from South America, where it is most extensively grown, on account of its useful and medicinal properties. Some have supposed its native country to be Africa, but Pohl expressly states it to be indigenous to Brazil, where there exist many apparent varieties, differing chiefly in the breadth of the segments of their leaves, which that author has distinguished in his truly splendid "Icones et Descriptiones Plantarum Brasiliæ," as so many distinct species. Indeed, he says himself, of his dwarf "*Manihot pusilla*, Ego quidem meam *Manihot pusillam* primitivam ipsius *Manihot utilissimæ* plantam esse censeo."

It is stated in the Hortus Kewensis, that the *Jatropha Manihot* blossoms in our collections in the months of July and August. But I have never been able to procure recent flowering specimens; and I have felt greatly obliged to my valued correspondent, Dr. Nicholson of Antigua, for an excellent drawing, here given, made from the recent plant in that island.

Two kinds are especially cultivated in the Colonies, the *Sweet Cassada* of Browne's Jamaica (p. 350), and Lunan's Hort. Jam. (v. 1. p. 163) *Manihot Aipi*, Pohl; whose root is of a white color, and free from deleterious qualities: and the *Bitter Cassada*, whose root is yellowish, and abounds in a poisonous juice. We shall confine our observations to the latter kind, which is the one here figured and described. They seem not to differ in botanical character.

When it is considered, that the *Manioc* belongs to a tribe of plants, the *Euphorbiaceæ*, which is essentially distinguished by its acrid and poisonous qualities, and that the root of the plant itself abounds in a juice of this peculiar character, it cannot fail to excite astonishment in the

minds of those who are not already aware of the fact, that it nevertheless yields an abundant flour, rendered innocent indeed by the art of man, and thus most extensively employed in lieu of bread, throughout a very large portion of South America: and that even to our country it is largely imported, and served up at table, under the name of *Tapioca.*

Such is the poisonous nature of the expressed juice of the *Manioc,* that it has been known to occasion death in a few minutes. By means of it, the Indians destroyed many of their Spanish persecutors. M. Fernier, a physician at Surinam, administered a moderate dose to dogs and cats who died in a space of twenty-five minutes, passed in great torments. Their stomachs, on being opened, exhibited no symptoms of inflammation, nor affection of the viscera, nor was the blood coagulated, whence it appeared, that the poison acted on the nervous system; an idea that was confirmed, by thirty-six drops being afterwards administered to a criminal. These had scarcely reached the stomach, when the man writhed and screamed with the agonies under which he suffered, and fell into convulsions, in which he expired in six minutes. Three hours afterwards, the body was opened, but no alteration was found, except that the stomach was shrunk to less than half its natural size: so that it would appear that the fatal principle resides in a volatile substance, which may be dissipated by heat; as, indeed, is satisfactorily proved, by the mode of preparing the root for food.

By various processes, by bruising between stones, by a coarse rasp, or by a mill, the root of the *Manioc* is broken into small pieces, then put into a sack, and subjected to a heavy pressure by which all the juice is expressed. What remains is *Cassava* or *Cassada,* which, if properly dried, is capable of being preserved for a great length of time.

In French Guiana, according to Aublet, *Cassava flour* is made, by toasting the grated root over the fire, in which state, if kept from humidity, it will continue good for twenty years.

Cassava-cake or *Cassava-root* is the *meal,* or the grated, expressed, and dried root of the *Manioc* pounded in a mortar, passed through a coarse sieve, and baked on flat circular iron plates fixed in a stove. The particles of meal are united by the heat, and when thoroughly baked in this manner, form cakes, which are sold at the markets, and universally esteemed as a wholesome kind of bread. The Spaniards, when they first discovered the West Indies, found this in general use among the native Indians, who called it *Cazabbi,* and by whom it was preferred to every other kind of bread, on account of its easy digestion, the facility with which it was cultivated, and its prodigious increase." —*Long in Lunan's Hort. Jamaic.* Again, in Guiana, *Cipipa* is another preparation from this plant, and is the name given to a very fine and

white fecula, which according to Aublet, is derived from the expressed juice of the roots, which is decanted off, and suffered to rest some time, when it deposits an amylaceous substance, which requires repeated washing. I know not whether this is exactly analogous to our *tapioca.* "The juice," says Sloane, "evaporated over the fire, gives the *tapioca* meal." But Lunan tells us, that from the "roots of the *Sweet Cassada, tapioca* is made in Jamaica, in every respect similar to that imported; which is done by grating them, washing and infusing them in water, and evaporating the liquor so as to obtain a sediment like starch which must be well dried in the sun."

The root of the *Manioc* is also the basis of several kinds of fermented liquors; and an excellent condiment for seasoning meats, called *Cabion,* or *Capion,* is prepared from the juice, and said to sharpen the appetite. The leaves beaten and boiled are eaten after the manner of spinach; and the fresh root is employed in healing ulcers.

From what has been above stated, it will appear, that the expression of the juice from the root deprives the latter of all its deleterious properties; and that the application of heat to these juices, renders their residue also, wholesome and nourishing. And whilst *Cassava-bread* is, as Sloane says, in the most general demand of any provision all over the West Indies, and is employed to victual ships; the use of *tapioca* is still more extended, and throughout Europe is largely employed, for the same purposes as *sago* and *arrow-root.*

An acre of ground planted with *Manioc,* yields nourishment to a greater number of persons, than six acres cultivated with the best wheat: but it is probable that it greatly exhausts the soil. The estate of Manidocca in Brazil, the residence of M. De Langsdorff, is so called on account of the excellency of the *Manioc* or *Mandiocca* roots, which are cultivated on it. There, after burning the felled trees, the lands are planted with cuttings, *(manibas)* of this plant. In eighteen or twenty months, during which time the farmer endeavours above all things to check their upward growth by breaking out the buds, the roots have attained their full size. Each plantation usually yields three crops, and is then abandoned. *(Spix and Martius' Travels in Brazil.)*

Fig. 1. Branch of a plant with Female Flowers. 2. Panicle, with mostly Male Flowers. 3. Pistil. 4. Stamens and Nectary. 5. Anther. 6. Seed. —3, 4, 5, *magnified.*

As the majority of the present Members may not have a copy of the earlier publications of the Society in their possession to refer to, it has also been deemed advisable to

reprint, in the present number, a short notice, on the same subject, from the pen of the late Mr. John Bell, which is published in the second volume of the "Transactions."

I have the pleasure to submit to the Society, a sample of what I shall term "*Tapioca powder*," to distinguish it from *Cassava flour*, since by the method I have prepared it, it will not be readily recognized as the tapioca of commerce, nor as the common *Cassava* flour, although possessing the properties of both.

You will perhaps recollect that I applied to you sometime ago for a few plants of the *Cassava, (Jatropha Manihot,)* and that you gave me a note to Mr. Andrew from whom I received, on the 15th May last, fourteen stems. These I planted five feet apart in light sandy soil, and have derived abundant produce from them, indeed I might probably have had more, but being anxious to extend my cultivation, I lopped off from time to time the branches of the original plants, without reference to the injury they thus sustained in their progress to maturity.

The roots were equal in size to any that I have seen in the West Indies. I had them washed and stripped of the rind, then ground to a pulp, which was thrown into a clean cloth, and the acrid poisonous juice well wrung out. The pulp thus partially deprived of its impurity was exposed for a few hours to the influence of the sun, by which any remaining juice was successfully taken up. The mass was next mixed with clean water, (much in the manner of arrow-root,) strained, and the pulp thrown away. The milky substance thus obtained was allowed to settle, when the clear water was carefully drawn off, and the subsidence again and again watered, until it became perfectly firm and white; it was then put in the sun until quite dry, crushed and passed through a muslin sieve.

The labor incurred by this process, is trifling; and considering the very high price of tapioca, and the difficulty of obtaining it fresh and genuine, I think that its introduction in India would be attended with benefit, inasmuch as a wholesome and nutritious article would be placed within the reach of all classes, whereas, dependant as we now are on foreign markets, thousands of invalids and children are wholly debarred from purchasing tapioca, which is procurable only in small quantities at an expense beyond their means.

To use this powder, it is only necessary to mix up a table spoonful with cold water into a paste, then pour *boiling* water, stirring it all the while, and put it on the fire for three minutes, when it will become a

fine transparent jelly, whereas the tapioca in grains, requires a very long time to dissolve by boiling. It will afford me great pleasure, if this communication is acceptable to the Society, and may be the means of drawing attention to further inquiry, touching an article so much esteemed.

JOHN BELL.

Calcutta: 17th April, 1833.

N. B.—I have since cultivated the *Manihot* in several other spots of ground; but find that a rich heavy soil will not answer.

To make the information yet more complete, we have introduced what is given on this subject in the *Penny Cyclopædia* under the article Tapioca.—EDS.

Tapioca, a farinaceous substance, prepared in South America from two species of *Janipha,* or the bitter and sweet *Cassada* or *Manioc* plants, which two were long regarded as one species, and comprehended under the name of *Jatropha Manihot,* till Pohl distinguished them, calling the latter *Manihot utillisima* and the sweet *Manihot Aipi* (Pohl. *Pl. Brasil* ic. i. 32 t. 24). The chief distinction between them is that a tough ligneous fibre or cord runs through the heart of the *Cassava* root, of which the latter is destitute. Though the bitter contains a highly acrid and poisonous juice, from which the sweet is exempt, yet the bitter is cultivated almost to the entire exclusion of the other, which is probably owing to the greater facility with which it can be ground or rasped into flower, owing to the absence of the ligneous centre. The poisonous principle of the bitter *Manioc* is thought to be of the nature of hydrocyanic acid (Ginbourt, *Hist. des Drogues,* tom. ii. p. 455. 3 iéme ed.) It is easily dissipated or decomposed by heat or fermentation: hence the flower becomes perfectly wholesome in the process of baking the *Cassava* bread. The juice after expression may be inspissated by long boiling or formed into a soup with flesh and spices, called *Cassarepo.* By means of molasses it can be fermented and converted into intoxicating drink.

The fecula or flour, after the juice has been carefully expressed, having been washed and dried in the air without heat, is termed *Mouchaco* in Brazil, *Moussache* in the Antilles, and *Cypipa* in Cayenne. This constituted the Brazilian arrow-root of English commerce. When this fecula is prepared by drying on hot plates, it becomes granular, and is called *tapioca.* It occurs in irregular lumps or grains, and is partially soluble in cold water. The granules, diffused through water and examined by the microscope, are of great uniformity of size, and smoother than those of arrow-root from the *Marantas.* Tapioca is very nutritious and easy

of digestion, being free from all stimulating qualities. It is therefore very necessary to distinguish it from an artificial tapioca made with gum and potatoe starch, which is in larger granules, whiter, more easily broken, and more soluble in cold water than the genuine.

On the mode and cost of separating Cotton-wool from the seed, in various parts of India.

In the Report of the Committee convened to consider the proposed prize for an improved cotton-cleaning machine, unrestricted to any particular mechanical principle, (see Volume VII. page 35,) it is suggested that the Society should obtain full sized working models of all the cotton-cleaning machines, known in practical use. When addressing various Correspondents of the Society on this subject, it was also considered desirable to apply to them for information respecting the working of such machines, with any other particulars that could be obtained. The following queries were accordingly circulated over various parts of India:—

1.—What is the average cost of a *churka* in your district?

2.—Whether worked by men or women? and at what cost of labor per diem?

3.—The average number of pounds weight of seed-cotton passed through one *churka* per working day?

4.—How many hours constitute a working day in your district?

5.—The average number of pounds weight of *cleaned* cotton turned out of one *churka* per working day?

6.—Is the cotton cleaned by the ryot who grows it at his own residence, or does it change owners previous to its being cleaned, or is it removed to a central rendezvous previous to its being cleaned under any arrangement with the zemindar or village headman?

7.—Have the American saw-gins been tried in the district, and with what success?

To the above the Society have been* favored with the following replies from Coimbatore, Tinnevelly, Assam, Central India, and Agra. Should any additional information be received from the Correspondents resident in other parts of the country to whom they have applied, it will be published in a subsequent number of the Journal.

I.—*Replies from Coimbatore.* *By* Dr. Wight.

1st. From 8 to 12 annas, especially if one that has been used and ascertained to be a good and easy working machine. New ones are not coveted, when tried ones are procurable. On this ground I procured one of the latter for the Society, which was reported an efficient machine, though a very plain one to look at.

2nd. By women and boys; men seem to think it "infra dig" to work such a machine. Cotton in this district is usually cleaned by contract, 1 anna for 25 lbs., or one Madras maund, equal to 1,000 tolla weight.

3rd. It is said a good hand cleans a maund of seed-cotton per diem, but I believe about 20 lbs. is near the average.

4th. Between 9 and 10 for hired laborers. That is, from sunrise to sunset, with a rest of 2 hours, (from 12 till 2,) during the heat of the day. This scarcely applies to *churka* work, that being all done by contract. Parties engaged are more or less industrious according as it suits their own convenience.

5th. The proportion of cotton to seed as cleaned by the *churka*, being from 23 to 25 per cent., gives from 4½ to 6 lbs. clean cotton to one *churka* per diem.

6th. Most ryots, who are careful about their seeds (constituting the majority) select the finest of their crop and clean it at home for the sake of the seed and clothing for their families. The rest they generally sell to local merchants who then store it in their godowns and clean it at their leisure, but some of the more wealthy ryots who can afford to wait so long for their money prefer cleaning their whole crop at home, finding that the more profitable course. When merchants buy it they give out part to families whom they can trust, and part is cleaned on their own premises, each woman bringing her own *churka*. I have never heard of either zemindars

or village headmen having any thing to do with the crops in this district, except in cases where they have previously made advances on the growing crop. In such cases they are entitled to adopt measures to recover their advances, and then they get the credit, and I believe justly, of appropriating the lion's share of the produce.

COIMBATORE: *December*, 1849.

II. *Replies from Coimbatore. By* E. B. THOMAS, ESQ., *Acting Collector.*

Your note, with queries found me *here*, having left the Tinnevelly District some six months back; but I have forwarded your Memo. to the gentleman acting for me in Tinnevelly, who will, I have no doubt, furnish you gladly with all information in his power, which I have requested him to do direct.

Thinking you might also wish for similar information from hence, I have added it. The *churka*, in use here and in Tinnevelly, is the same, and is so simple and well known a machine, that it would not be worth while to send you a model.

---

1. The price of a *churka* in the Coimbatore district varies from 6 to 8 annas. (16 annas to a Rupee.)

2. The *churka* is worked by women only. There are two modes of paying for their labor, the one which is not very generally adopted is the payment of a daily hire of one anna each; and the other, (much preferred by the Natives, and universally observed, as least expensive,) is payment of one anna and 4 pie for every 25 lbs. of seed-cotton.

3. From 12 to 17 lbs.

4. 11 hours may be considered as constituting a working day—that is, from 7 to 12 A.M. and from 2 to 6 P.M.

5. 3 to 4½ lbs.

6. The cotton is not cleaned generally by the grower, who only sells the seed-cotton to merchants. They collect the article at Coimbatore or other large towns, and clean it previous to exportation; a small quantity is cleaned by the growers themselves, spun, and sold in the bazar, to meet their daily expences.

7. The American saw-gin has been used for the American cotton grown in the *Government Farm*, and that purchased on account of

Government; but is not generally made use of by the Natives, who looking rather to the quantity than to the quality of the cotton, prefer the *churka* to the gin, which they consider as causing wastage, and injuring or cutting the *fibre*. It is, however, probable that as its advantages become more generally known, it will be more used.

4th October, 1849.

III. *Replies from Tinnevelly. By* MR. CUXTON, *Superintendent of Government Cotton Gins in that district. Communicated by* C. J. BIRD, ESQ., *Acting Collector.*

At the request of E. B. Thomas, Esq., the Collector of this district, but at present acting as Principal Collector of Coimbatore, I have the honor to enclose copies of replies to the several questions appended to, your letter to Mr. Thomas, dated 15th August last, of which those to the first six were furnished by Mr. Cuxton, in charge of the Government Cotton Gins in this district.

1st. The average cost of a *churka* about here is six annas.

2nd. Invariably worked by women; who are paid at the rate of one anna for *churkaing* 25 lbs. of seed-cotton.

3rd. If the people employed in *churkaing* keep diligently at their work, 25 lbs. of seed-cotton can be got through in a day, but this is generally considered very hard work: moreover, as their employers do not exact from them any stated quantity of labor, the people work leisurely, and are paid for as much as they do. As the result of enquiry, 20 lbs. seems to be the average quantity passed through one *churka* per day.

4th. As concerns the *churkaing* business, the people say from 7 in the morning to 5 or 6 at evening.

5th. The out-turn of clean cotton and seed by the *churka* on 100 lbs. of seed-cotton passed through it is respectively lbs. 25 and 75, or three parts seed and one of clean cotton. The average quantity of seed-cotton passed through one *churka* per working day, being 20 lbs. as above stated; the out-turn of this 20 lbs. is 5 lbs. clean cotton and 15 lbs. seed, which I think answers the 5th question, asking for the average number of lbs. weight of cleaned cotton turned out of one *churka* per day.

6th. The latter part of this question is quite unintelligible to me, and strikes me as perhaps being some arrangement peculiar to the Bengal Presidency, for I have never heard of any such procedure up in Coimbatore, and as I have ascertained nothing of the sort exists even here where extensive cotton transactions are carried on. Ryots or those who grow the cotton, for the most part sell their seed-cotton, but occasionally clean any small quantity *for the sake of the seed* either for the feeding of their cattle or for sowing, for which latter purpose they are particular about the quantity of seed, and rather than purchase seed of a mixed quality, they clean good seed-cotton themselves and appropriate the seed for sowing. They do also, I believe, *generally* purchase seed for their cattle, and are only led to clean seed-cotton for the sake of the seed for their cattle as above stated, when seed sells at a high rate at the market where they usually purchase it. Those among the ryots who are pretty well off are generally in no hurry about selling their seed-cotton, and store it up, selling it leisurely, and to as much advantage as they can. But the needy ones among them, I believe, follow this plan. While the crop is coming on and finding themselves in want of money, they go to merchants and others who are in the habit of purchasing seed-cotton, and get the loan of funds from them in this manner. They get the merchant to go with them and inspect their fields, and between them conjecture as to the quantity likely to be produced, and settle the price per load, at which it is to be supplied when picked. If for instance a field is likely to yield 10 loads of seed-cotton, the merchant makes a bargain with the ryot for one-half or five loads of it, say at 6 or 7 Rupees per load or *pothee*, and pays him accordingly. When the crop is picked, the ryot is bound to supply him the specified quantity at the settled rate, although seed-cotton may, at the same time, in other quarters be selling for as much as 8 or 10 Rs. per load. In this manner a great quantity of seed-cotton comes into the possession of merchants, residing in towns or large villages, &c. as for instance, a great quantity comes into the hands of people here at Sevacassee from the neighbouring small villages, inhabited chiefly by ryots; those merchants clean the seed-cotton and sell it. In Sevacassee, I believe, there are about 25 *churkaing* or cotton-cleaning houses owned by merchants and others.

7th. With regard to the 7th question. The American saw-gins have been tried in the Tinnevelly district, but little if any, besides the cotton grown on the Government experimental farms, have been ginned. The people have not grown the foreign cottons to any extent worth speaking of; and they consider that the country cotton is injured by the saws, and this opinion, I understand, is held also by the European Agents for purchasing cotton at the Port.of Tutacorin.

TINNEVELLY; *23rd October*, 1849.

IV. *Replies from Assam. By* MR. BEDFORD, *Sub-Assistant Commissioner. Communicated by* MAJOR JENKINS.

Your note regarding the cleaning of cotton and the machines made use of in this province for the purpose, I have made over to Mr. Bedford at Goalparah, where alone cotton is cleaned by hired laborers. Elsewhere this operation is always performed by the females of a family, and I hope to submit his reply at an early date, and to send you with it one of the sir ·.e machines in use in these parts.

Even at Goalparah very little cotton is cleaned; it is almost all exported raw, being intended for the zillahs of Mymensing, Rungpore and Dinajpore, which have such immense overwhelming populations: it would be very unprofitable to pick the cotton in our districts where labor is so scarce and dear.

GOWHATTY: 31*st August*, 1849.

With reference to your circular regarding the local *churkas*, Mr. Bedford has promised to send by the *Jumna* a *churka* from Goalparah, and he answers your queries as follows:

"1. Price of a *churka* from as. 1 to 2.

2. No one makes a separate livelihood by cleaning cotton, but both men and women are occasionally hired for this work.

3. No trial made.

4. Ditto ditto.

5. 8 or 9 hours.

6. The cotton is grown by the Garrows in their hills, and brought down to the weekly *hauts* in the plains, where it is bartered to ryots and trading merchants, who atttend the *hauts* in boats fom all parts of the country within 50 miles around. Very little cotton is grown in the plains of Assam. The *hauts* are free of all tolls, and open to all comers."

The above is applicable to all Assam, the hill growers being in other parts, Booteahs, Nagas, and Cacharies, and what little cotton is grown in the plains is generally for the family consumption of the growers, except in Muttock, whence a good deal of cotton, and the best in the province, is exported.

There is a very large proportion of the land in Muttock adapted to the growth of cotton.

GOWHATTY: *27th September*, 1849.

V.—*Replies from Central India. Communicated by R. N. C. Hamilton, Esq., Resident at Indore.*

I have the honor to forward to you replies to the several queries regarding cotton received from Officers in charge of different parts of the province of Malwa and Nimar, in the valley of the Nurbudda; also replies to the questions by Captain Fenwick, late of the Nizam's service, who was extensively concerned in cotton in Berar.

2. I will take an early opportunity to forward to you a Native *churka* as used at Indore.

3. On the 18th April 1848, No. 37,—I submitted a full report on this most interesting subject to the Government of India.*

INDORE RESIDENCY: *20th September* 1849.

Central Malwa, Mehidpore.

1. The average cost of a *churka* within the circle of my superintendence is about 1 rupee 8 annas.

2. The *churka* is worked both by men and women, each receiving 2 annas per diem.

3. About 60 pounds weight of seed-cotton are passed through one *churka* per working day.

4. Of cleaned cotton 15 or 16 pounds weight are, at an average, turned out of 1 *churka* per working day.

5. About twelve hours of actual labor constitute a working day, an hour and a half allowed at 12 o'clock, being exclusive of the working hours.

6. The cotton the ryot grows is not cleaned at his own residence. It, as a general system, changes owners before undergoing that process, although individuals whose means admit of it have it

* This communication will be found in the present number.—EDS.

occasionally cleaned at home, nor is it removed to any central rendezvous previous to cleaning; each ryot keeps his own until disposed of.

Rutlam.

1. The price of a *churka* varies from 4 to 14 annas, and the average cost may be put down at 12 annas for a tolerably fair *churka.*

2. It is worked by both sexes, but more generally by women, and the price for labor per diem varies from 4 to 6 annas.

3. Say 32 seers or 64 lbs., from which quantity 23 seers or 46 lbs. of seed are daily disengaged, provided the *churka* is worked throughout the entire day.

4. About 9 seers or 18 lbs., and this quantity is so thoroughly sifted that any further winnowing would be considered perfectly superfluous.

5. The *churka* is usually worked throughout the day, and employed for a shorter space of time on private contracts alone, but there is no specific or regulated time, or number of hours which constitute a working day.

6. The cotton is cleaned by the purchasers alone, the ryots never in any instance having undertaken that work themselves, and there is no central rendezvous, the purchasers invariably taking the cotton to their own respective residences.

Nimar valley of the Nurbudda.

The average cost of a *churka* is, for the separate parts, as follows:

Iron roller, ...	0	12	0
Wooden ditto and other wood, ...	0	4	0
Carpenter's fee, ...	0	4	0
Total, ...	1	4	0

2. Usually by 2 women or a man and a woman, the day's pay being 1 anna each.

3. 24 seers of raw cotton or 48 pounds.

4. 6 seers of clean cotton or 12 pounds. A class of Mussulmans called Seindies, go from village to village about the Northern part of Nimar, cleaning cotton at a contract rate of 96 seers or 192 lbs. of raw cotton for one Rupee. In Khundwa a custom prevails of getting it cleaned at the rate of 3 pies ($\frac{1}{4}$ anna) for each seer of raw

cotton, and another of giving the seed to the cleaner as his fee; the owner expecting ¼ of the weight of the raw cotton returned clean, ¾ being allowed as weight of the seed.

5. Usually 10 hours on an average, but the Seindies abovementioned work 12.

6. Generally the cotton is sold uncleaned; but it is considered a great saving if there are women enough in the house to clean it before selling. No custom exists of collecting the cotton in one place, it is sold like grain or other produce as opportunity offers.

Berar.

1. The cost of a *churka* is about 2 rupees.

2. It is generally worked by women, two to each *churka,* they are paid by job work at the rate of 4 pice or about 2 annas per maund, of *kupas,* or cotton with the seed. 20 women will clean 25 maunds of *kupas* a day, which at 4 pice each is 100 pice, equivalent to 2-12 Hydrabad rupees, at 34 pice to the rupee. Say about 2-8 per *pullah* of cleaned cotton, 240 lbs. avoirdupoise, one khundee of *kupas,* equivalent to 778 lbs. will produce 180 lbs. of cleaned cotton. The seed, 598 lbs. usually pays for the cleaning.

3. Are included in the above

4. Are included in the above.

5. Are included in the above.

6. The cotton is often cleaned by the ryot at his own residence. They also take it with the seed to weekly markets (hauts) in large quantities, on carts, but the largest portion of it gets into the hands of middle men, who have made early advances. These again either clean it themselves or sell it to "Soudharas," whose profession is cleaning cotton, and others. The cleaned cotton ultimately passes into the hands of wholesale *beuparies* and *surraffs,* who finally deliver it to the Bombay dealers, from whom they too have received advances, and some of them send a portion of what they receive from the middle men and ryots to Bombay on their own account.

VI.—*Replies from Agra. By H. H. Bell, Esq.*

No. 1. The cost of the *churka* in use in Agra, and contiguous districts, varies from 6 to 8 annas per *churka.*

2. It is worked indifferently by men and women, and the average of some 500 or 600 people employed by me, gave 1½ anna for the

day's labor. It is always piece work to free the cotton from its seed.

3. The average weight of seed-cotton varies with the proportion of seed. In my experience *kupas* has yielded from 25 to 40 per cent. of clean cotton.

4. The average out-turn of clean cotton cannot, I think, be taken higher than 8 ℔s. for a day's work. Some women have turned out 10 or even nearly 11 ℔s., and one or two men as nearly as 16 ℔s., but this was clearly *very* hard work.

5. I think a day's work may be taken as 11 hours, from which one must be deducted for dinner; but the practice is to begin soon after sunrise and work till sunset, and in the long days 12 hours may be the usual time.

6. The ryott and his family clean (that is, free from seed) the cotton they grow for the most part, the custom here being opposed to the sale of the *kupas*. It requires great and decided influence to induce them to sell the cotton unseeded. I do not believe that the village traders ever deal for the *kupas*, and it is to them the ryott sells his produce. I am told, however, that in some districts this is not the case; but I doubt the information. The *Buneea* would have to give the *kupas* to the ryott to be freed from the seed without the possibility of check, and when there is so great variation in this cotton, the proportion of cotton would be the minimum produce.

On the Culture of Cotton in Malwa and other States, connected with the Indore Residency.

[Communicated by the Government of India.]

FROM R. N. C. HAMILTON, ESQ.,
Resident at Indore,

TO H. M. ELLIOT, ESQ.,
Secretary to the Government of India.

Dated Indore Residency, 18*th April,* 1848.

SIR,—I have now the honor to forward for submission to the Right Honorable the Governor General of India, infor-

mation regarding the culture of cotton in Malwa, arranged in replies to the questions put by the Honorable Court of Directors.

2. I have endeavored to condense in a tabular form the information collected from various quarters so as to show the statistics in each district of Malwa, Nimar, Bhopal and other States within the circle of this Residency.

3. Having, during my several annual tours, occupied myself in ascertaining the extent and nature of the cotton trade, and of the species of cotton raised in Malwa, I believe the information now transmitted may be relied upon.

4. Opium during the last ten years has almost superseded cotton, still there has always been a good deal produced, and attention is again being turned to cotton in consequence of the fall in opium, but the difficulty the producer in Malwa has to overcome is not in the cultivation of the plant but in exporting his cotton to a mart.

5. I was much struck last February to find when at Sutwass, in Kantaphore, about 33 miles from Indore, in the upper valley of Nimar, on the right bank of the Nerbudda, a large quantity of cotton about to be sent to Mirzapore, via Hushungabad and Saugor: the cost of the cotton at Sutwass was 22 Rupees per *bojah* of 4 *pucka* maunds, and the cost of land-carriage 11 Rupees, so that at Mirzapore the cost of the cotton would be about eleven Rupees the cwt. or 2½*d.* per pound avoirdupois at Mirzapore.

6. The resources of India suitable for exportation can never be brought into a foreign market with a remunerating return until something is done to improve and accelerate the means of intercommunication.

7. It seems almost incredible, but it is a fact, that it actually takes a longer time to convey the cotton to a port than to rear the plant, yet the distance to be travelled in India for this purpose is now traversed in Europe in a few hours; the cotton-growing districts of Malwa not being 400 miles from the

port of Bombay; and though two months would be consumed in accomplishing this distance, still Mirzapore on the Ganges is now resorted to,—that mart being upwards of 400 miles distant, after which the cotton has to be conveyed by the river to Calcutta.

8. The Central States between the Satpoora range, or between the Taptee and Delhie, or those of Nimar, Malwa, Meywar, Rajpootana, Jeypore, Kotah, Boondy and Bhopal, have no water carriage for their commerce, like the Dooab, Rohilkund, Oude, or Benares provinces; they depend upon the slow marches of bullocks or of camels, to convey their products, and, from the expenses of transport, they are almost excluded from participating in the benefits of commerce.

9. Surely then, these are the districts towards which the science, the ingenuity, the skill and capital of Britain should be turned, not only as most likely to improve the social and commercial condition of the people, but also as most likely, from the absence of competition, to yield a fair return on the outlay.

10. That which the British Government should undertake, and which the Native States on the line would, if required, aid with their contributions, is one main line or trunk Railway from Bombay to Delhie. Our Government must take the initiative, the works should be placed under English superintendence; not suffered to risk the trials, vexations, and disgusting jobbery of unscrupulous Committees, to whose management no native merchant in the interior will ever now entrust a fraction, and whose reputation, I say in sorrow, is one of the most painful and distressing in remote parts, where once the word of a British merchant was accepted unquestioned, and sacredly regarded.

11. It is only the Government and its guarantee that can be expected to draw Native Chiefs and monied men in the interior into associations for the promotion of public works; and I would strongly urge upon the consideration of His Lordship in Council the desirability of framing some scheme

for the part of the vast Empire to which I have alluded, by which the benefit of rapid intercommunication might be extended; with its train of social, commercial and political advantages, in which the Government, the Chiefs, and individuals might be combined, and the works carried on by able and experienced Europeans, under the countenance and protection of the Government Local Functionaries.

1st. What was the price of cotton freed from seed in your district last year, at this season, and what is it now?

2nd. At what rate do the ryots and cultivators sell cotton freed from seed if paid in advance, and what if not paid in advance?

3rd. What are the expenses of separating the seed from the cotton by *(churkee)* distaff, or any other machine used in this country?

4th. What are the expences of transporting cotton from your district to Bombay, Surat, Tunkaria Bunder, Mirzapore or any other market, and to what port or market is it sent the most?

5th. How much is the average produce of cotton in a *beegah?*

6th. How much land in your district is under cotton cultivation, and to what extent could it be increased?

7th. What is the measure, currency, the weight of seer, maund, and *maunee* in your district?

Indore Proper.

1. It was 7 seers per rupee last year, and now sells at 15 seers.

2. The husbandman does not separate cotton from seed, and with seed it is sold at 16 seers per *maunee*, if an advance be taken it sells a quarter less, i. e. 12 rupees per *maunee.*

3. *Churkee* is the only machine,—expense 4 rupees per *maunee.*

4. It goes from Indore to Mirzapore and not elsewhere: a cart carrying 5 *bojahs* is hired for 55 rupees, and 5 rupees of duty must be added.

5. In the best land a *maunee*, and in bad 6 maunds, one produce.

6. 5,000 *beegahs* are under cotton cultivation, and 1,000 more could be added.

7. 110 cubits square make a *beegah*, a seer 82 Hallee rupees, a *kutcha* maund is 20 seers, 12 *kutcha* or 6 *pucka* maunds make a

maunee; the currency is Hallee rupees; a *bojah* is 4 *pucka* maunds about 3 cwt.; the Hallee and Co.'s rupees are nearly par.

Samaire.

1. 6 seers per rupee last year, 5 seers per rupee now.

2. At 16 seers per *maunee* not cleaned of seed, no advance is made.

3. *Churkee* the only machine, expense 2 rupees 4 annas.

4. Very little cultivated, and often brought from Indore for use. Sent nowhere.

5. 2 *kutcha* maunds, produce of one *beegah*.

6. Only 2 or 300 *beegahs* are now under cotton, but it could be extensively increased.

7. The seer 80 Hallee rupees, 1 *kutcha* maund 20, and *pucka* 40 seers, 12 *kutcha* or 6 *pucka* maunds a *maunee; bojah* 4 *pucka* maunds. Hallee currency.

Mehidpore.

1. 27 rupees per *maunee* last year—42 rupees this year.

2. At 39 to 42 rupees per *maunee* this year—2 rupees less if paid in advance.

3. *Churkee* the only machine, expense 2 rupees per *maunee.*

4. It is transported from Mehidpore to Kulpie or Mirzapore at the additional cost of 2½ rupees per maund. In transporting it to Tunkaria Bunder, Surat or Baroach 1 rupee 4 annas per maund would be the expense, but here the experiment has never been tried. From Rutlam, Kochrade and Burnugger it is often sent to those ports.

5. 6 maunds of 18 seers each in a *beegah* including seed—cleared of seed it remains 1½ maund, the most produce is 4 maunds, which gives 1 maund of cotton without seed.

6. About 10,000 to 12,000 *beegahs* are now sown with cotton, about 2,000 more could be added, it is capable of still further increase as it can grow in the *jowar, moorg* and *thoor* fields.

7. 5¼ square cubits make a *biswahsee,* 5¼ cubits wide and 105 long make a *biswah*—20 square *biswahs* make a *beegah;* a seer 80 Hallee rupees, a maund 18 seers, and 12 maunds of this weight is a *maunee.* The currency is Oojein or Indore Rupees, known as Hallee Rupees.

Rampoora.

1. 4½ seers per rupee at Rampoora, 1½ per rupee at Maunassa.

2. No advance is ever made in this district, cotton with seed 21½ rupees per *maunee* without its seed.

3. *Churkee* the only machine: rupees 3-8 per *maunee* the expense of separating seed.

4. This district does not send cotton anywhere.

5. Only a maund of cotton with seed is produced in a *beegah.*

6. Very little cotton is cultivated here, altogether about 30 or 40 *beegahs,* as much more could be added.

7. 60 square yards is a *beegah;* a seer 96 Salim Shaee Rupees at Rampoora, 91 rupees at Maunassa; 20 seers a maund, 12 maunds a *maunee.* The currency is Salim Shaee Rupees, which is from 18 to 20 per cent. worse than Hallee.

Mulharghur.

1. 3½ rupees per *kutcha* maund last year, 4 Salim Shaee Rupees now.

2. 19 rupees per *maunee.* No advance made.

3. *Churkee* the only machine, expense 3 annas per maund *kutcha.*

4. Very little produce brought in from Meywar for consumption.

5. 6, 4, and 2 maunds per *beegah* is the produce.

6. 1,000 *beegahs* under cultivation, more could be added.

7. 60 yards square a *beegah,* 84 Salim Shaee Rupees a seer, 20 seers the *kutcha* maund, 12 *kutcha* or 6 *pucka* maunds a *maunee.* Salim Shaee Rupees the currency.

Sunjeit.

1. 3 *kutcha* rupees per maund last year, 3½ this year.

2. 14 *kutcha* rupees per maund, no advance made.

3. Ditto ditto, expense 2 annas per maund *kutcha.*

4. Transported nowhere, very little, barely enough for internal consumption is produced.

5. The average produce per *beegah* is 3 maunds.

6. 200 *beegahs* under cultivation.

7. 90 hands or cubits square is a *beegah;* 32 Salim Shaee Rupees a *kutcha* seer. 12 *kutcha* or 6 *pucka* maunds a *maunee.* Salim Shaee Rupees the currency.

Burrowda.

1. 2 rupees 12 annas per maund last year, 3½ this year.

2. With seed on advance 17 rupees, without seed 19 rupees per *maunee.*

3. Ditto ditto, expense 4 annas per *kutcha* maund.

4. Transported to Baroach or Tunkaria Bunder alone, at an expense of 1 rupee 5 annas per maund.

5. The average produce per *beegah* is 3 maunds.

6. From 3 to 400 *beegahs* under cultivation: could be increased.

7. 100 square cubits make a *beegah,* 74 Salim Shaee Rupees a seer, 20 seers a *kutcha* maund. 12 *kutcha* or 6 *pucka* maunds or 40 seers each a *maunee.* Salim Shaee Rupees the currency.

Jowrah.

1. 3 rupees 4 annas per maund last year, 4 rupees this year.

2. On advance 18 rupees, otherwise 20 rupees per maund.

3. Ditto ditto, expense 4 annas per maund.

4. Transported from Jowrah to Baroach and Tunkaria Bunder, at an expense of 1 rupee 5 annas per maund.

5. 3 maunds the average produce.

6. 1,000 *beegahs* under *cultivation*: could be increased.

7. 100 cubits square make a *beegah*—84 Salim Shaee Rupees a seer, 20 seers the *kutcha* maund, 6 *pucka* or 12 *kutcha* maunds the *maunee.* Salim Shahee Rupees the currency.

Talmunda Wal.

1. 3 rupees 4 annas per maund last year, 4½ rupees this year.

2. No advance given, about 20 rupees per maund.

3. Ditto ditto, expense 2 rupees 12 annas per *maunee.*

4. Sent to Kochrade or Rutlam alone.

5. 2 to 6 maunds per *beegah.*

6. 1,200 *beegahs* are under cultivation—more could be added, but the profit is not equal to the labor and expense.

7. 105 square cubits make a *beegah,* 82 Salim Shaee Rupees a seer, 20 seers to a *kutcha,* and 40 to a *pucka* maund—6 *pucka* or 12 *kutcha* maunds is a *maunee.* Salim Shaee Rupees is the currency.

Rutlam.

1. 3 rupees 8 annas per maund is the present rate of "*sutta.*"

2. 16 rupees per *maunee* with seed. No advance in this district.

3. *Churkee* the only machine, 2 rupees 6 annas the expense per *maunee* for separating the seed.

4. Sends cotton only to Baroach, a large bag of 16 maunds or a small one of 9 maunds costs 5 rupees and 3 rupees respectively for transport.

5. 24 ? or 6 *kutcha* maunds is the produce of a *beegah.*

6. No proper estimate can be formed of the extent to which cotton is cultivated, but probably it may be 3,500 *beegahs.*

7. 41 Salim Shaee Rupees to a seer, 40 seers to a maund, 12 maunds to a *maunee.* Salim Shaee Rupees the currency.

Konwar (Dhar).

1. 2 rupees per *kutcha* maund last year, 3 rupees this year.

2. 11 or 12 rupees per *maunee,* on advance a rupee less.

3. Ditto ditto, 2 rupees 2 annas the expense per *maunee* for separating the seed.

4. Sends to no other market but Bunnugger and Rutlam.

5. Ditto ditto.

6. 60 *beegahs* are now under cultivation, could be increased to 125 *beegahs.*

7. 20 *beegahs* of 5 cubits each make a *beegah,* 80 Hallee rupees a seer, 20 seers a *kutcha* and 40 seers to a *pucka* maund, 12 *kutcha* maunds to a *maunee,* 4 *pucka* maunds to a *bojah.* Hallee Rupees the currency.

Chiculda.

1. 16 rupees per *beegah* last year, and 16 rupees this year.

2. 17 rupees a *maunee,* on advance a rupee less.

3. Ditto ditto 4 rupees 4 annas the expense per *maunee* for separating the seed.

4. Transported to Baroach and Baroda at an expense of $1\frac{1}{2}$ rupees per maund, i. e. 1 rupee hire for carriage, and 8 annas as duty.

5. A piece of land in which a maund of seed could be scattered is called a *beegah.* Its growth depends on rain, no accurate estimate can be formed of the extent of cultivation.

6. No extent can be accurately estimated.

7. The *beegah* is not measured here—80 rupees to a seer, 40 seers to a maund, 12 maunds to a *maunee*. Hallee Rupees the currency.

Kantophore.

1. 16 rupees last year, 22 rupees this year.

2. 17 rupees per *maunee* on advance, or 20 rupees without advance.

3. Ditto ditto, 4 rupees per *maunee* expense for separating the seed.

4. Transported to Mirzapore only at a cost of 55 rupees for five *bojahs*, i. e. 50 rupees hire for carriage and 5 rupees duty.

5. 1½ maunds is the average produce of a *beegah*.

6. 2,000 *beegahs* are now under cultivation, 1,000 more could be added.

7. The land in which a *maunee* of seed may be scattered is called a *beegah* here, 90 rupees to a seer, 40 seers to a maund, 12 maunds to a *maunee*, 4 maunds to a *bojah*. Hallee Rupees the currency.

Sehore.

1. 5 rupees 12 annas per maund last year, 6 rupees 8 annas this year.

2. 6 rupees 8 annas per maund without seed, with seed 2 rupees 8 annas per maund. On advance 2 rupees 4 annas per maund.

3. *Churkee* is the only machine, and the expense in separating seed 5 annas per maund.

4. Transported to Mirzapore: a bullock or buffaloe carrying 3 *pucka* maunds cost 7 rupees 8 annas, beside 1 rupee duty.

5. 2 maunds 10 seers average.

6. Not extensively cultivated now, but could be increased.

7. 1,000 cubits square makes a *beegah*, 60 rupees a seer, Bhopalee currency, 40 seers a maund, 8 maunds a *maunee*. A wooden cup used as a measure of wheat called *kora*—98 rupees make a *kora*, 32 *koras* a maund. Bhopal Rupee is the currency, 8 per cent. worse than Company's.

Bairseeah.

1. 6 rupees per maund last year, 8 rupees 8 annas this year.

2. 8 rupees per maund without seed, with seed 2 rupees 8 annas per maund. On advances still less.

3. As preceding.

4. Transported to Mirzapore at an expense of 5 rupees per maund, i. e. 3 rupees duty, 2 rupees hire, it is also transported to Kalpee at the same rate.

5. 2 maunds is the average.

6. 5,000 *beegahs* are now under cultivation, 2,500 *beegahs* more could be added.

7. 105 cubits square make a *beegah,* 100 rupees a seer for cotton or opium, and 82 rupees a seer for corn—40 seers to a maund, 4 maunds to a *maree.* Bhopalee Rupees the currency.

Serong.

1. 6 seers per rupee last year, 4½ seers per rupee this year.

2. 12 seers per rupee with seed, 4½ seers without seed. On advances the price is little less.

3. *Churkee* the only machine; 1 rupee 8 annas per *maunee* is the expense for separating seed, sometimes the seed is taken in lieu of cash payment for wages.

4. Sent nowhere, very little being produced.

5. 3 to 4 maunds per *beegah.*

6. Very little is sown.

7. 9 *kutcha bojahs* make 6 *pucka,* 104 Serooj rupees to a seer. A *maunee* is 4 maunds. Currency the Serooj Rupee.

Dhar.

1. 24 rupees per *maunee* last year, 36 rupees this year.

2. 36 rupees per *maunee,* 1 rupee 8 annas per *maunee* less if paid in advance.

3. *Churkee* is the only machine, expense of separating seed 2 rupees per maund.

4. Nowhere transported save to Rutlam and Indore, expense of transport cannot be accurately known.

5. The best produce is 6 maunds per *beegah,* 4 maunds the next and 2 maunds the third.

6. From 1,000 to 1,200 *beegahs* are under cultivation in the whole district of Dhar. Could be increased from 1 to 200 *beegahs* more.

7. 20 *biswahs* make a *beegah,* 80 rupees to a seer, 40 seers to a *pucka* maund, 6 maunds to a *maunee,* 4 maunds to a *bojah.* Hallee Rupees is the currency.

Nemawar.

1. 16 rupees per *bojah* last year, 20 rupees per *bojah* this year.

2. 20 to 23½ rupees per *maunee* with seed, without seed the cotton is 4 maunds *(bojah)*, 21 rupees on advance, the rate this year was 16 rupees a *maunee*, and without advance 20 rupees.

3. Ditto ditto, expense of separating seed 4 rupees per *maunee*.

4. Transported to Mirzapore only, if on a camel the expense is 7 rupees per *bojah* (4 maunds), if on a cart 12 rupees per ditto.

5. 2 maunds only is produced in a *beegah*, in which the cotton is 20 seers and the seed 1½ maunds.

6. 2,000 *beegahs*: capable of increase.

7. A *beegah* is of 20 *biswahs*, revenue on a *beegah* 1 rupee, 90 rupees to a seer, 40 rupees to a maund, 12 maunds to a *maunee*, 1 *bojah* is 4 maunds. Hallee Rupees is the currency.

Milkheira.

1. 5 rupees per maund last year, and 7 rupees per ditto to this year.

2. 12 rupees per *maunee* with seed, seed never taken out from the cotton, if an advance of 1 rupee per *maunee* less.

3. Ditto ditto, 1 rupee 9 annas per *maunee* the cost of separating the seed.

4. No exports.

5. 1 maund 10 seers *pucka* is the produce of a *beegah* of seedless cotton.

6. 1,000 *beegahs* are under cultivation: no increase is possible.

7. 100 square cubits make a *beegah*, 80 rupees to a seer, 25 seers to a maund, 8 maunds to a *maunee*. Boondy Rupees the currency.

Kanur.

1. 6 rupees per maund last year, 7½ rupees per ditto this year.

2. 12 rupees or 12 rupees 8 annas per *maunee*, a rupee less in advance.

3. Ditto ditto, 1 rupee 12 annas per *maunee* the cost of separating the seed.

4. Consumed, not exported.

5. 2 or 2½ maunds is the produce per *beegah*.

6. 500 *beegahs* under cultivation: the same number of *beegahs* could be added.

7. 100 cubits square is a *beegah*, 80 rupees a seer, 17 seers a maund, 12 maunds a *maunee*. Boondy Rupees the currency.

Piplone.

1. 3¼ rupees per maund last year, 3½ rupees this year.

2. 12½ rupees per *maunee*, on advance 10 rupees per *maunee*.

3. *Churkee* the only machine, 1 rupee 8 annas per *maunee* cost of separating the seed.

4. Consumed, not exported.

5. 2 or 3 maunds per *beegah* the average produce.

6. 300 *beegahs* are under cultivation, 10 *beegahs* more could be added.

7. 100 cubits square makes a *beegah*, 80 rupees to a seer, 16 seers to a maund, 12 maunds to a *maunee*. Boondy currency.

Soosnair.

1. 3¼ rupees per maund last year, 4 rupees this year.

2. 12 rupees per *maunee*, on advance 11 rupees.

3. Ditto ditto, 1 rupee 4 annas per *maunee* cost of separating seed.

4. Ditto ditto ditto.

5. 2 maunds the most, 1 maund 17½ seers the least produce of a *beegah*.

6. 1,000 *beegahs* are under cultivation, 150 more could be added.

7. 90 cubits square to a *beegah*, 80 rupees to a seer, 25 seers to a maund, 8 maunds to a *maunee*. Boondy currency.

Soheit.

1. 6½ rupees per maund last year, 4 rupees this year.

2. 21 rupees per maund, no advance taken.

3. Ditto ditto, 4 rupees per *maunee* cost of separating the seed.

4. Ditto ditto ditto.

5. 1 maund or ½ a maund of 42 seers the produce of a *beegah*.

6. 100 or 125 *beegahs* are under cultivation: no increase could be made.

7. 100 cubits square to a *beegah*, 80 Hallee Rupees to a seer, 42 seers to a maund, 8 maunds to a *maunee*. Boondy currency.

Rooneja.

1. 3 rupees per maund last year, 3¾ per ditto this year.

2. 15 rupees per *maunee,* no advance taken.

3. Ditto ditto, 2 rupees per *maunee* the cost of separating the seed.

4. Ditto ditto ditto.

5. 4 *kutcha* maunds is the produce of a *beegah,* 3 maunds the least.

6. 500 *beegahs* are under cultivation, 300 *beegahs* more could be added.

7. 90 cubits square to a *beegah,* 84 rupees to a seer, 16 seers to a maund, 12 maunds to a *maunee.* Salim Shace Rupees the currency.

Dewass.

1. 26 rupees per *maunee* without seed last year, 31 or 32 ditto this year.

2. 13 rupees per *maunee* with seed, on advance 10 rupees per *maunee.*

3. Ditto ditto, 1 rupee 12 annas per *maunee* the cost of separating the seed.

4. Ditto ditto ditto.

5. 4 maunds of 17 seers each of the best kind, and either 1 maund or say 2 the least produce of a *beegah.*

6. 275 *beegahs* are under cultivation, a few *beegahs* more could be added.

7. 20 *biswahs* to a *beegah,* 80 rupees to a seer, 17½ seers to a *kutcha,* 12 maunds to a *maunee,* 4 *pucka* maunds to a *bojah,* 40 seers a *pucka* maund. Currency Hallee Rupees.

Baroud.

1. 3¼ rupees per *maunee* last year, 3½ this year.

2. 12 rupees per *maunee,* and sometimes 12½ rupees—on advance 10 rupees per maund.

3. *Churkee* the only machine, 1 rupee 8 annas per maund cost of separating the seed.

4. Consumed, no export.

5. 6 *kutcha* maunds could be produced in a *beegah,* the least 4 maunds.

6. 500 *beegahs* under cultivation, 300 more could be added.

7. 100 cubits square to a *beegah*, 80 rupees to a seer, 16 seers to a maund, 12 maunds to a *maunee*. Boondy currency.

Mundisore.

1. 3 rupees per maund last year, 3-12 this year.
2. 16 rupees a *maunee* with seed, 15 rupees on advance.
3. Ditto ditto, 2 rupees per *maunee* cost of separating the seed.
4. Transported to Baroach, 2 rupees 2 annas the duty.
5. 2 to 6 maunds produced in a *beegah*.
6. 2,000 *beegahs* are under cultivation.
7. 100 cubits square to a *beegah*, 92 rupees to a seer, 15 seers to a maund, 12 maunds to a *maunee*: the currency Salim Shaee Rupees.

Kochrade.

1. 2 rupees 12 annas per maund last year, 3 rupees 12 annas this year.
2. 21 rupees per *maunee* with seed, 18 rupees on advance.
3. Ditto ditto, 2 rupees per *maunee* cost of separating the seed.
4. Transported to Baroach, 1 rupee 2 annas the cost per maund, but when sent to Tunkarea Bunder 1 rupee 9 annas.
5. 6 maunds the produce of a *beegah*.
6. 2,000 *beegahs* are under cultivation, 500 more could be added.
7. 100 cubits square to a *beegah*, 82 rupees to a seer, 20 seers to a maund, 12 maunds to a *maunee*. Currency Salim Shaee Rupees.

Naharghur.

1. 3 rupees per maund last year, 3 rupees 12 annas this year.
2. 16 rupees per *maunee* with seed, 15 on advance.
3. Ditto ditto, 2 rupees per *maunee* cost of separating the seed.
4. Is sent to Mundosore, at a cost of 12 annas per *maunee*.
5. 3 to 6 maunds the produce of a *beegah*.
6. 400 *beegahs* are now under cultivation, 100 more could be added.
7. 100 cubits square to a *beegah*, 92 rupees to a seer, 16 seers to a maund, 12 maunds to a *maunee*. Currency Salim Shaee Rupees.

Lookhera.

1. 3 rupees per maund last year, 3-12 this year.
2. 16 rupees per *maunee* with seed, 15 on advance.

3. *Churkee* the only machine, 2 rupees per *maunee* cost of separating the seed.

4. Condemned, no export.

5. 3 to 6 maunds the produce of a *beegah.*

6. 100 *beegahs* under cultivation, as much more can be added.

7. 100 cubits square to a *beegah,* 80 rupees to a seer, 20 seers to a maund, 12 maunds to a *maunee.* Currency Salim Shaee Rupees.

Curil.

1. 2 rupees per *maunee* last year, 2-12 this year.

2. 12 rupees per *maunee* with seed, 10 on advance.

3. Ditto ditto, 1 rupee 8 annas per *maunee* cost of separating the seed.

4. Is sent to Kochrade at a cost of 1 rupee per *maunee.*

5. 3 to 4 maunds the produce of a *beegah.*

6. 600 *beegahs* are under cultivation, 500 more could be added.

7. 100 cubits square to a *beegah,* 80 rupees to a seer, 18 seers to a maund, 12 maunds to a *maunee.* Currency Hallee Rupees.

Bhussowda.

1. 4 rupees per *maunee* last year, 4-8 this year.

2. 15 rupees 12 annas per *maunee* with seed, no advance made.

3. Ditto ditto, 2 rupees per *maunee* cost of separating the seed.

4. Consumed, no export.

5. 1½ to 2 maunds the produce of a *beegah.*

6. 900 *beegahs* are under cultivation, 50 could be added.

7. 100 cubits square to a *beegah,* 82 rupees to a seer, 20 seers to a maund, 12 maunds to a *maunee.* Currency Hallee Rupees.

Dicthan.

1. 20 rupees per *beegah* of seedless cotton (of 4 maunds) last year, and 18 rupees ditto this year.

2. 7½ rupees per *maunee* with seed, no advance made.

3. Ditto ditto, 3 rupees per *maunee* cost of separating the seed.

4. Is sent to Burnuggur at a cost of 5 rupees per cart, carrying 3 rupees per *maunee.*

5. 1½ to 6 maunds the produce of a *beegah.*

6. 150 *beegahs* are under cultivation: 25 could be added.

7. 20 *biswahs* to a *beegah*, 80 rupees to a seer, 40 seers to a maund, 6 *pucka* maunds a *maunee*, 4 maunds to a *bojah*. Currency Hallee Rupees.

Sagore.

1. 20 rupees per *maunee* last year, 24 rupees this year.

2. 12 rupees per *maunee* with seed, no advance made.

3. *Churkee* the only machine, 2 rupees per *maunee* cost of separating the seed.

4. Consumed, no export.

5. 5 maunds the average produce.

6. Not known.

7. 100 cubits square to a *beegah*, 80 rupees to a seer, 20 seers to a *kutcha* maund, 12 maunds to a *maunee*. Currency Hallee Rupees.

Burnuggur.

1. 17 rupees or 18 rupees per *bojah* last year, 26 or 27 this year.

2. 10 to 14 rupees per *maunee* always with seed, 2 rupees per *maunee* less on advance.

3. Ditto ditto, expense of cleaning 2 rupees 5 annas per maund.

4. Consumed, little or no export.

5. 2, 4, to 6 maunds the produce.

6. Not known.

7. 5 cubits square to a *biswah*, 20 *biswahs* to a *beegah*, 80 rupees to a seer, 20 seers to a *kutcha* maund, 12 maunds to a *maunee*, 4 maunds to a *bojah*: currency Hallee Rupees.

Sonekutch.

1. 5 rupees per *maunee* last year, 8 rupees this year.

2. 12 rupees per *maunee*, with seed 10 rupees per *maunee*.

3. Ditto ditto, expense of cleaning 1 rupee 12 annas per *maunee*.

4. Sent to Oojein and Burnuggur.

5. 4 *kutcha* maunds the average produce.

6. 3,000 *beegahs* under cultivation, as many more could be added.

7. 5 cubits square to a *biswah*, 20 *biswahs* to a *beegah*, 80 rupees to a seer, 18 seers to a *kutcha* maund, 12 maunds to a *maunee*. Currency Hallee Rupees.

Bhorassa.

1. 18 to 20 rupees per *bojah* last year, 28 to 30 this year, of seedless cotton.

2. 12 rupees per *maunee* without seed, on advance 10 rupees ditto.

3. Ditto ditto, expense of cleaning 2 rupees per *maunee*.

4. Sent to Oojein and Indore at a cost of 1 rupee 8 annas per *bojah*.

5. 3 to 4 maunds per *beegah*.

6. 600 *beegahs*, as many more could be added.

7. 5 cubits square to a *biswah*, 20 *biswahs* to a *beegah*, 82 rupees to a seer, 18 seers to a *kutcha* maund, 12 maunds to a *maunee*. Currency Hallee Rupees.

Newree.

1. 16 rupees per *beegah* last year, 22 rupees ditto this year.

2. 12 rupees per *maunee* with seed, 8 rupees per ditto on advance.

3. Ditto ditto, expense of cleaning 2 rupees per *maunee*.

4. Ditto ditto ditto.

5. 2 to 6 maunds per *beegah*.

6. 750 *beegahs*, 600 more could be added.

7. All as the preceding.

Shujawalpore.

1. 40 rupees per *maunee* last year, the same this year.

2. 14 rupees per *maunee* the bazar rate, 8 rupees on advance.

3. *Churkee* the only machine, expense of cleaning 2 rupees per *maunee*.

4 Consumed, no export.

5. 2 to 4 maunds per *beegah*.

6. Not known.

7. 5 cubits square to a *biswah*, 20 *biswahs* to a *beegah*, 60 rupees to a seer, 28 seers to a maund, 8 maunds to a *maunee*, 6 maunds to a *bojah*. Currency Hallee Rupees.

Tonk.

1. 30 rupees per *maunee* last year, 36 rupees this year.

2. 13 rupees per *maunee* with seed, 10 rupees per ditto on advance.

3. Ditto, 2 rupees ditto.

4. Ditto, ditto ditto.
5. 3 to 6 maunds ditto.
6. Not known.
7. All as preceding, only that 18 seers make a maund.

Seetamhow.

1. 3 rupees 12 annas per maund last year, 4 rupees this year.
2. 15 rupees per *maunee* with seed on advance, without advance 17 rupees.
3. Ditto, 2 rupees 12 annas ditto.
4. Ditto ditto ditto.
5. 3 maunds ditto.
6. 3,000 *beegahs* under cultivation, 3,000 more could be added.
7. 100 cubits square to a *beegah,* 40 rupees to a seer, 40 seers to a maund, 12 maunds to a *maunee.* Currency Salim Shaee Rupees.

Augur.

1. 8 seers per rupee last year, 5 seers per rupee this year.
2. 12 rupees per *maunee* with seed, 10 rupees ditto on advance.
3. Ditto 1 rupee to 1½ anna ditto.
4. Sent only to Rutlam at a cost of 4 rupees per *bojah* of 4 maunds.
5. 3 ditto ditto.
6. Not known.
7. 100 cubits square to a *beegah,* 82 rupees to a seer, 16 seers to a maund, 12 maunds to a *maunee.* Boondy currency.

(Sd.) R. N. C. Hamilton, *Resident.*

(True Copies.)

P. Melvill,
Under-Secy. to the Govt. of India.

Report on samples of Tobacco and Coffee; raised at Hazareebaugh, by MR. C. WHEELER.

I have the pleasure to advise you of the despatch of samples of Cuba, Bhilsa, and Gibali tobacco, grown from seeds furnished last year by the Society. Also ten seers of coffee, received lately from the Government Garden at Chota Nagpore; as also a few flower seeds.

The tobacco flourished luxuriantly here, both in my Nursery Garden, and in my Coffee plantation. It was much destroyed by insects at first, which were very abundant this year; I imagine from the small quantity of rain that fell last season. First a hairy worm attacked it, and afterwards a small kind of cricket, and no care appeared altogether to prevent their ravages. The plants were much watered, as this climate is very dry. I shall esteem it a favor if the Committee on Tobacco will pass their opinion on the three kinds, and state which is the best, and most likely to flourish in this climate, judging by the samples; the plants of which all grew equally well. Of course, the sort deemed most valuable would be the one I ought to increase the cultivation of. Of the three, I prefer the flavor of the Cuba, which is far superior to any of the native sorts that I have yet seen. I shall be very thankful to have a comparison made between the Cuba grown here and that grown elsewhere in the East Indies, and of the marketable value of it. I have sent some to be made up into segars, and I hope they may be ready in time for your meeting, when I trust the Members will be able to give a favorable opinion upon them. If I find it likely to be profitable, I shall introduce the cultivation into this district, where at present there is no tobacco grown. I may add, that by further care, and richly manuring the soil, the tobacco may be cultivated in a superior manner, especially as the soil here is entirely free from saltpetre. I shall be very happy to try other sorts, if the Society can procure me seeds from Manilla, and Sandoway,

and Latakia. The sample of coffee, I hope, will be considered as got up in an improved manner. The beans appear to be of a good color, and were not much broken in the process, and it is not deficient, I think, in aroma, and it will improve by age, having been plucked only in February last.

My coffee nursery is still very flourishing, and the seeds last obtained from Government are germinating in great numbers. I shall be glad to supply any body requiring young plants at 12 rupees per 1,000. Some seeds procured from Ceylon, and which arrived out of the husk, and were planted by separate half berries, as I understand is the custom on that island, have entirely failed: but all which I planted from the Government Garden, in whole berries, have germinated. I am glad to find the demand for coffee seeds increasing, and have supplied the following gentlemen, Mr. Cooke, of Goruckpore; Mr. Gubbins, of Meerut; Dr. Sutherland, at Azimghur; and Major Spottiswoode, of Haupper; but I am very much of opinion, that their seeds will not all germinate, as their applications came too late in the season, with the exception of Mr. Cooke's.

When I last reported progress, I had completed planting out by the end of October, which I imagine was rather late, as no more rain fell to enable the plants to recover themselves after removal; and curious to say, the young plants suffered more than the older ones; a hard winter followed, and many nights of severe frost, such as has not been known here before, which proved fatal to about two-thirds of the plants, though carefully watered and attended to. Perhaps the water increased the cold, and did injury, but they looked so sickly, that I thought it might revive them, and as the roots are now nearly all still alive, and beginning to sprout again with this genial hot weather, I cannot think that my treatment destroyed them. Nor can I attribute it to anything but the frost, which visibly nipped them more and more every night; whilst the plants in the nursery of

every growth from seedlings to those now bearing, were entirely uninjured; which I attribute to the partial shelter of hedges and fruit trees.* At Chota Nagpore also, young plants which had been out some months before mine, suffered in a like manner.

With respect to coffee thriving best on virgin soil, as is constantly stated, I may mention, that my plantation is on land that must have laid fallow from 12 to 14 years, that is before Hazareebaugh was made a cantonment, of which this land is a portion. I did not obtain possession of it in time to give it more than three ploughings, which may have left some injurious properties in the soil that injured the coffee plants. But newly cleared forest land must be still more pernicious. Indeed, the cultivators in this part of the world never sow newly cleared ground, but keep constantly turning it for three or four years, as they declare the soil, until it has been well exposed to the air, is deleterious to grain. How will coffee planters reconcile this statement? Perhaps the cause may be the absence of primitive forests *containing large trees*, though I think some of the jungle within 20 miles of this may come under this designation.

27th May, 1850.

To the Members of the Committee on Coffee and Tobacco.

No. 1. Muster of tobacco raised from Cuba seed.
No. 1. *A.* Musters of cigars made from Cuba tobacco.
No. 2. Tobacco raised from Gibali seed.
No. 3. Ditto from Bhilsa seed.
No. 4. Coffee raised from Mocha stock from Col. Ouseley's Plantation.

GENTLEMEN,—I have the pleasure to submit for your opinion certain musters of tobacco and one of coffee, as detailed in the margin. These musters have been raised at Hazareebaugh, by Mr. Wheeler, who appears to be a very zealous

* This failure has not only been the means of throwing me back a whole year, but has subjected me to severe pecuniary loss, and it has also had the effect of shaking my former confidence respecting the successful cultivation of coffee in this vicinity.

No. 5. A sample of coffee from Col. Ouseley's Plantation.*

agriculturist. Mr. Wheeler's communication is also circulated for your information.

METCALFE HALL:
24th July, 1850.

JAMES HUME,
Honorary Secretary A. and H. S.

* N.B.—This is sent for the sake of comparison. Full particulars regarding this coffee will be found in Journal A. and H. S., Vol. VII. p. 7, a copy of which is likewise circulated.

Samples of Tobacco.

No. 1. Sample of tobacco raised from, I presume, *imported* Cuba seed. A good and creditable specimen, partaking of the mildness and fragrance of the leaf of original stock, but wanting in some respects of good or careful curing. It is of fair strength and good color. The value in this market of the above tobacco it is impossible to quote with any correctness, as it is a description unknown in the Calcutta bazar, but I think rupees 6½ to 7 per maund (bazar) may be stated as the price which it would fetch with reference to its probable value in home market.

The musters of segars made from the above tobacco and which accompany are too new to form at present any judgment on, but they should be kept in a dry place for a few months and then re-submitted for the opinion of the Committee. They appear well made and of good scent.

No. 2. Sample of Gibelli tobacco. Not so well grown as the other musters, and with a coarseness of appearance and indifferent color in some of the leaves, but apparently of strong flavor though little fragrance. Probable value in this market rupees 3½ to 4 per maund.

No. 3. From Bhilsa seed. A favorable specimen of this description of leaf, with good color, strength and flavor and considerable scent; worth here probably rupees 5 per maund.

No. 4. Coffee sample from Hazareebaugh, evidently from Mocha stock, as indicated by the berry, small, even, round, hard and of fragrant smell; a very fair specimen as the produce of young trees. Kept for a couple of years this sample would be materially enhanced in value. I deem its worth in London market to be 50*s*. to 54*s*. per cwt. in bond, irrespective of the excited prices which now rule there for all coffees of colonial growth. If aged and more mellow it would likely fetch 60*s*. I recommend the producer to send home 1 or 2 cwt. *packed in a barrel,* and I shall be happy to obtain for him from experienced parties there a full and particular report on it. The sample of coffee grown by the late Col. Ouseley at Chota Nagpore, and which accompanied the above, is a very choice article and improved by age; worth 60*s*. per cwt. in bond.

JAMES COWELL,

CALCUTTA:
25*th July,* 1850.

I agree in opinion with Mr. Cowell. } WM. STORM, F. P. STRONG.

I think the above remarks applicable to the tobacco. The coffee is very much like what I sent to the Royal Asiatic Society, and to the Court of Directors, between 15 and 20 years ago; the opinion of the brokers is to be found in our Volumes. The coffee in vial marked A (Col. Ouseley's) I prepared and tasted yesterday, the other this morning—the latter is far superior to the other in taste; the berry is much like all I have grown, and seen in this country, and unlike the Java article always grown under the shade of the *Dadap. (Erythrina Corallodendron.)*

30*th July.* F. P. STRONG.

Report on some Soap-yielding pods from China.—By DR. FALCONER.

I have examined the pods and seeds sent round by Dr. Macgowan, as yielding a kind of vegetable soap or cosmetic* used by the Chinese, and supposed by him to belong to a species of *Sapindus.*

These pods consist of a broad-oblong thick legumen—with equal cartilaginous valves and a uniform cavity, containing 3 or 4 roundish seeds, each about the size of a tea seed, the pod splitting imperfectly by the ventral suture and feeling greasy. It belongs to a leguminous plant of the *Cæsalpinia* tribe, and closely allied to the genus of that name. It has no relation whatever to "*Sapindus*" which yield the soap nuts of India *("Reetha")* and other countries.

The pods have a peculiar heavy and somewhat fetid odour. The cosmetic principle consists of a cartilaginous layer lining the interior coat of the seed and enveloping the embryo, of about $\frac{1}{20}$th of an inch in thickness. Treated with hot water it first gelatinises into a transparent colorless matter, like starch jelly, exhibiting no structure, when examined under the microscope, and then slowly dissolves. The inner surface of the valves of the pod is lined with a thinner layer of the same substance, exhibiting the same appearances when treated with hot water.

A chemical examination of the substance would be of much interest.

* Specimens of the soap and cosmetic received from Dr. Macgowan are deposited in the Society's Museum.—EDS.

On the silk of the Sandoway district, and the mode of manufacturing it. By Lieut. A. FYTCHE, *Principal Assistant Commissioner of Arracan.*

In 1847, Major Bogle, the Commissioner of Arracan, forwarded to the Society some fine specimens of silk, in the raw and scoured state, raised in the southern part of the Sandoway district not far from the Burmese town of Bassein, on which the following report was given by Mr. J. W. Laidlay, a member of the Society's Silk Committee:

"If this silk had been reeled more carefully, it would without doubt, meet with a very ready sale in England. As it is, it is uneven, and abounds in *gouts* (as they are technically called), which would be very much objected to by the manufacturer. The silk is harsh from being reeled at too high a temperature, and the lustre of the scoured specimen is slightly impaired by the process adopted for the removal of the gum. But the staple is excellent; and if it can be produced cheap, such a manufacture should be encouraged. The thread would suit the English market better if only half the thickness, or indeed if much less than that; 8 to 10 or 12 to 14 cacoons. As no silk of this kind is sent to England, I can give no idea of its value."

Major Bogle stated, in reply to an enquiry, that though he was not aware on what tree the worm producing this silk fed, he understood it was *not* the mulberry; but promised to communicate fuller information hereafter. This he was unable to afford, in consequence of his departure, shortly after, for the Punjaub. In February 1850, Capt. Phayre, who had succeeded Major Bogle, as Commissioner of Arracan, being applied to on the subject, communicated the following particulars:—

"Agreeably to your wish to know something regarding the silk produced in this part of the world, I wrote to Lieut. Fytche, who is the P. A. at Sandoway, where the silk is *grown*,

if that be a correct term. By this steamer I send up specimens of the worms, the silk, and the moth in a box, to your address. I also send an extract from Lieut. Fytche's letter to me, which contains some interesting particulars relative to these insects, and their introduction into this province.

I shall be glad to hear what is thought of the quality of the silk.

AKYAB: *March 27th,* 1850.

Extract of a Letter from Lieut. A. FYTCHE, *Principal Assistant Commissioner at Sandoway, regarding the silk-worm and silk of the Sandoway district, with specimens.*

I have the pleasure to send you some of our silk-worms preserved in spirit, as also some of the cacoons, and a bit of cloth on which the moth has laid its eggs. The little caterpillars you see in the bottle, are, as they appear first from the egg, they remain in a dormant state for four days, and are then fed on the mulberry leaves for four days, when they attain the size of the large ones, which is the utmost size they obtain; eight days they remain more, in their large state, and then change into a chrysalis form, and spin their cacoons: the moth after a lapse of eight days then breaks from its cacoon, lives for a space of eight days, lays its eggs, and dies. By the time the little basket reaches, in which I have packed the cacoons and eggs, the moths will, I have no doubt, have "burst their cerements," but the case with the silk on, will remain, as also the shells of the eggs on the cloth, if the caterpillars are produced. The people in Calcutta, I imagine, think that our silk is common wild silk, not the yield of the domesticated mulberry worm, and similar to that produced near Sylhet (which I have seen myself) and in parts of Assam. Our worm is fed on the leaves of the mulberry plant (which the worms I have mentioned as having

seen at Sylhet, are not) is strictly the domesticated mulberry worm, and is tended with great care and attention. From the specimen of raw silk I send you, you will perceive that the staple is first-rate, but the silk badly reeled, very uneven, full of knots and lumps, which are, I believe, technically termed gouts. If the people could be taught a better system of reeling, I imagine these lumps, &c. could be avoided, and the silk be more valuable, perhaps not in the native market, as the lumps do not seem to cause any obstruction in the native loom, but the English manufacturer would find great fault with them. I enclose in this letter some of the mulberry leaves that came in with the worms, I have not had time to press and dry them, as I do not like to lose this opportunity of forwarding the worms, &c. by Lt. Faithful, who leaves for Kyouk Phyoo to-night, but if they do not arrive in a good state, you can get some out of Lt. Hopkinson's garden to send up, they are, if I remember rightly, exactly similar. The silk-worms and mulberry plants have been brought by immigrants from Burma into this district: from several old men, whom I have asked concerning them, it appears that there were little *or none*, in the time of the Arrakan Rajas, but that it sprung up during the reign in this Province of the Burmese. The silk-worms in the Ava Territories came originally from the Shan states, and the latter are believed to have obtained them from China; they are tended in Burma chiefly by the Ya-bheins, but the Burmese have learnt the art from them, and cultivate the mulberry plant to some extent. The Ya-bheins are a hill tribe bordering on the Shan states, and numbers of them have come down and settled in the Delta of the Irrawaddi. The mulberry plant is cultivated, and the silk-worms tended in this district by Burmese immigrants; there are a few Karens, as also Kyeugs too, who have learnt the art from the Burmese, and are now pursuing it here.

SANDOWAY: *March 22nd*, 1850.

When acknowledging the receipt of the specimens forwarded by Lieutenant Fytche, and furnishing him with an opinion thereon, he was requested to oblige the Society with a few additional particulars: first, whether, with reference to the size of the cacoons, (which are considerably larger than those met with in Bengal,) the worm is fed on the *standard* mulberry, or on the shrub: secondly, in advertence to the size of the thread, which is twice as thick as that of Bengal silk, the number of cacoons used for each thread, and if previously baked; and thirdly, at what rate per pound silk, similar to the muster submitted, could be procured. To these queries, Lieutenant Fytche has been kind enough to furnish the following information through Captain Phayre:—

"In reply to your letter of 9th May last, relative to the Sandoway silk, I have the pleasure to transmit herewith copy of a note on the subject from Lieutenant Albert Fytche.

With reference to what is said on the subject of the mulberry plants on that part of the coast where silk-worms are reared, I may add that the plant is not an *annual* one, but is allowed to grow for, I believe, five or six years before being cut down."

AKYAB: *Aug.* 3*d*, 1850.

In answer to the questions contained in Mr. Blechynden's letter, I have the pleasure to inform the Society that the Burmese divide the quality of their silk into three kinds, the thick thread, middling and fine; the middling sort is that most valued by them, and the specimen of silk forwarded by me for the Society, was a sample of this sort. After the cacoons are gathered they are carefully picked and assorted for each of the above mentioned kinds. About 100 of them are then placed in water in an earthen pot, and boiled over a fire, and an end of a thread is taken up from the pulpy mass, and wound off on a wheel as the silk is boiling in the pot. The Burmese never bake the cacoons. The worms are fed

on the shrub, not on the standard mulberry: when the shrub attains a large size, it is felled, and slips cut from it and planted out. Silk of the same kind, as forwarded to the Society, is procurable in the Sandoway bazaar, at from 5 Rs. to 5 Rs. 4 annas a pound, and the thick and middling sorts from 4 Rs. to 4 Rs. 12 annas ditto.

The above information concerning the mode of reeling the silk is not given from personal observation, but has been obtained separately from several parties, who have come at different times into the sudder station from the interior, where the mulberry plant is cultivated, and as they all agree in their accounts, I suppose the information given must be correct, though it appears to differ from the customs that prevail elsewhere.

(Signed) A. Fytche,
Principal Asstt. Commr. at Sandoway.

A mode of cultivating Strawberries at Hazareebaugh. Communicated by Mr. C. Wheeler.

Believing that the Society wish to hear as to the successful cultivation of strawberries in various parts of the country, I may mention that a gentleman here has been very successful this year: from 100 small beds, each containing 16 plants, he frequently got as much as 5 pounds of strawberries in one morning. He attributes his success to a plan which he has tried for the first time, viz.—to give the plants a second season as it were. In England they yield the best crops the second season, which is in the second year; but in this country, a quicker process is necessary. He therefore planted out immediately the rains had well set in, a large number of the young suckers, in a bed 50 feet by 6 feet; this was their first year; and in November, they were planted out into the beds, which were not particularly highly manured, but good garden soil, with which sand was mixed. The plants

were occasionally watered, whenever they seemed to require it, until January, when they began to flower; then they were watered every other day, and in April and May daily, when the weather became very dry: they thus continued in fruit full 3 months. There was a particularly healthy look about the plants, they were bushy, and stood from 15 to 18 inches in height, instead of lying on the ground, as plants from the same stock had done in previous years. Some of the fruit was as large as the finest *Hautbois.* The only precaution taken to preserve the fruit from injury, was to place a circular tile under each plant; this tile is 13 inches in diameter, made rather hollow (2½ inches) in the centre, in which there is a hole of 5 inches to admit the plant through. No baskets were required to cover the plants.

May 27th, 1850.

Mode of cultivating the Vegetable Marrow. Communicated by Lieut. JOHN ELIOT, *Artillery.*

I cannot say anything favorable of the Hobart Town parcel of seeds, but few germinated, and those appeared of inferior sorts. Of the Edinburgh also very few of each packet came up, but they appear good kinds, and I am now cutting some very nice vegetable marrow from this batch; a vegetable, which has not, I suppose, been eaten at Cawnpore before: it is too late in the season to sow seed I fear, but it may be useful to detail my plan, which I learned from a friend at Saugor. I dug a hole about 2 feet deep, and 2 feet in diameter, which I refilled with good rich earth, and in this planted two plants, when they had about six or eight leaves; it was on the north side, as I thought the sun would be too powerful. However, the plants did not thrive, the leaves were discolored, and the fruits dropped off when about an inch long,

so I took up the smaller plant and put it in the south side, where it has thriven. It grows up the branch of a tree into a chopper verandah, the lower part I protect at night with mats; I think February and March would suit it better.

CAWNPORE: *10th December,* 1850.

On the cultivation of Cotton in the Darjeeling Morung; and the capabilities of that tract for the extensive growth of superior cottons. By DR. A. CAMPBELL, *Superintendent of Darjeeling.*

TO JAMES HUME, ESQ., *Secretary Agricultural Society, Calcutta.*

SIR,—In 1842 I forwarded a sample of the cotton grown in the vallies of the Sikim Hills to the Society, which was reported on by the Cotton Committee in June of that year. See Proceedings of Meeting of the Society for July 1842. The wool was considered of indifferent quality, short in the staple, and adhering very tenaciously to the seed. I did not expect any other result, as the cotton in the hills is so carelessly cultivated that in many places the plant is almost reduced to its wild state. Nor could I then bring to the notice of the Society that improved sorts of cotton might be tried on an extensive scale and with good prospects of success, in a soil and climate which are, I believe, well suited to the experiment, as the country was not then British territory. Lately however, there has been an accession of hill and lowland territory in this direction, in which cotton is produced as a regular crop, and it has therefore become an object of much interest to have good and full information on the capabilities of the said territory for operations towards the introduction of the more valuable kinds of foreign cotton. As a preliminary to fuller information, and with a view to obtain the assistance and advice of the Society, as well as in some degree to satisfy enquiries that have been made of me on the subject, I have

compiled a short memorandum which I have now the pleasure to forward for the consideration of the Society.

I also forward a parcel of fresh picked cotton pods from the Morung for examination, and beg leave to suggest that it may be submitted to the Cotton Committee for report, so as to give us some idea of the real value in commerce of the indigenous article as now produced and of its quality, compared with the hill grown articles reported upon by your Committee in 1842. (Journal, Vol. 1, p. 39.)

I judge of the fitness of the Morung soil for the cultivation of cotton from the uniformly flourishing appearance of the crops in that locality. I have no means of judging from the amount of produce, with reference to extent of land, or as compared with other countries.

As regards the climate it appears to me to be admirably suited to the purpose, and in this respect I have little doubt that experiments with the best sorts of cotton, if carefully instituted, would lead to satisfactory results.

The peculiarity of the climate from which the greatest advantage may be expected is its uniform humidity in the months of April and May, as compared with Bundlecund especially, and even with Rungpore, in which districts the American planters employed by Government found the seed time much too dry for their cottons.

This is the impression on my mind from the recollection of their reports which I cannot now refer to.

I shall be very glad to hear from you, and to have any question the Society may think advisable to put. I cannot promise to institute an experiment myself with foreign seed, but if the Society think it a good plan to distribute seed among the native cultivators, I shall do so, taking all care to induce them to make a fair trial of it.

I remain, &c.,

A. Campbell.

Darjeeling:
The 18*th November*, 1850.

The Tarai along the base of the mountains from the Koosi river on the west to the Teesta on the east is called the Morung.

Description of Morung.

The portion of it lying between the Koosi, and the Mechi rivers belongs to Nipal. That portion of it east of the Mechi and extending to the Teesta belonged to Sikim: but has recently become British territory, and may now be most conveniently named the "Darjeeling Morung." This tract is about 45 miles long from west to east, and its average breadth may be about 15 miles.

Extent.

It has for convenience been divided into the Upper and Lower Morung. The upper portion may be characterised as chiefly covered with forest and jungle, it has a fertile soil, is inhabited by two tribes, named Meches and Dhimals, has an average breadth of 8 miles, and is alone that in which cotton is produced.

Divisions.

Upper Morung.

The lower portion is more open and cleared, has a good deal of rice cultivation, is inhabited chiefly by the Cooch tribe, is very fertile but *not* suited for cotton.

Lower Morung.

The rivers of the Darjeeling Morung reckoning from the west are the Mechi, which divides it from Nipal, the Chenga, the Balasun, the Mahanuddi, and the Teesta, which divides it from Bootan. The Upper Morung has, generally speaking, an easy declivity to the south, the rivers are rapid, and never overflow to flood the land—which is favorable for cotton. The Lower Morung is more level: but not by any means swampy. Having contrasted the two divisions, the remaining remarks will apply to the Upper Morung only.

Rivers.

Declination.

The soil best adapted for the cotton cultivation is a light blackish loam, occasionally mixed with gravel, and this is the general character of the soil throughout the tract.

Soil.

It produces one crop only of cotton until renewed by lying fallow. The forest or jungle being cut down in the cold season, the whole of the timbers and leaves are burned on the ground, and the ashes scattered over it. In March and April the ground is finally prepared with some care.

Preparation of ground.

In May and June the seed is sown, and November and December are the months for picking the crop. After one crop of cotton a rice crop is taken the following year, when the land is allowed to run fallow.

Seed time and harvest.

In 5 years it is again grown over with heavy jungle and fit for the growth of cotton. Manure—except the ashes—is never used. Irrigation is not practised, and the crop is generally a sure one.

Period of fallow.

The only causes of failure I can ascertain are, very heavy rains in October, when the pod is forming; and a dry month of May, when the seed is sown. The latter occurrence is very rare indeed in the Morung; during eleven years I have known but one instance of little rain in May, which is always a showery month in this direction. When the seed suffers from drought, a second sowing is made. During the same period—11 years—we have 3 times I think had heavy October rain.

Causes of failure.

Seed time showery.

In one of these years, 1848, it was very heavy for 4 days, 16th to 20th, and the cotton may have suffered: but I do not know the fact.

The seed is dibbled in by itself in the best cultivation: but sometimes it is broad cast along with rice. The former cultivation is called "keel" the latter "jhuggri." The quality of the produce is said not to be affected by growing with rice. The produce is always poor when weeding is neglected, and a well cultivated field is weeded 3 or 4 times during the growing

Mode of sowing.

Weeding.

season. The seed requires to be carefully kept from damp which destroys or impairs its vegetating powers.

Produce. There is no land measure in use in the Morung, so that I cannot give the amount of produce per beegah or acre, but I have ascertained that 3,000 square yards, i. e. a piece of ground measuring 60 by 50 yards, will yield 2½ maunds, or 200lbs. of cotton with the seed. It is calculated that the pods contain 2 parts of seed in weight to one of cotton.

Price. The present price of uncleaned cotton is 1 rupee 8 annas per *dang* of 16 seers—32lbs., say Rs. 4 to 4½ per maund; and this, at the rate of one-third or 10⅔lbs. of clean cotton from each *dang*, will average 2½ annas per lb.—or 5 annas per seer.

Labor. The Mech and Dhimal population is scanty, but labor is procurable among them now at 3 Rs. per mensem per man: for extended operations it would be necessary to procure *Dhangurs*, as they are able to live in health in the Upper Morung all the year round, as well as the native tribes. The *Dhangurs* are fond of the Morung, and would come willingly to work on cotton cultivation at 3 or 3-8 each per mensem.

Roads, &c. The centre of the cotton growing tract is about 35 miles from Darjeeling to which there is a good road, and about 10 miles from Kursiong, which has an elevation of 4,000 feet, and a healthy climate for Europeans all the year.

Water carriage. Water carriage for Calcutta during the brunt of the rains, July, August, September, can be had at Titalyah, and for the remainder of the year at Dulalgunge on the Mahanuddi river, 50 miles lower down.

Other cotton localities. A good deal of cotton is grown in the Nipal Morung to the west, and in the Bootan Dooars to the eastward; also in the valleys of Sikim, and in those of the Darjeeling Hill territory.

The quality of the cotton in all these localities is, I believe, alike: but the pod of the Morung cotton is considerably larger, than that grown in the hills.

DARJEELING: A. CAMPBELL.
November 18th, 1850.

Report by the Society's Committee on the above mentioned musters of Boll and Seeded Cotton.

Staple short, harsh, and curly; but of tough strong fibre; the wool, as usual, adhering tenaciously to the seed. Similar in character to the muster submitted by Dr. Campbell in 1842, except that the latter has acquired a yellow tinge from age. In ordinary times this cotton, in a cleaned state, might sell from 3*d.* to 3¼*d.* per ℔., but at the present excessive rates of cotton, which are not to be depended on, it may be valued at from 4¾*d.* to 5*d.* per ℔.

Hand-book for the Cultivation and Manufacture of Tea in Java. By J. J. L. L. JACOBSON, *Inspector of the Tea Cultivation in Java.*

[*Translated from the Dutch by* R. W. G. FRITH, ESQ.]

[Continued from page 72 of Vol. VI.]

CHAPTER XV.

On Fuel.

240. For drying the teas both wood and charcoal are made use of; the latter only however, when the drying is about being finished. The fuel is only required to be lighted during a portion of the day when the drying commences.

241. At the time of gathering, or the harvest, when 10 shrubs yield 1 pound of tea, and one garden, 100,000 trees, gives 10,000 pounds, that is, about 70 pounds per day, there will be required for

each factory 3 *pikolans** or ⅛ of a *toembak*,† and 1 *pikolan* or 70 pounds of charcoal, making at that rate, say 420 *pikolans* fire-wood, and 10,000 pounds charcoal, and for the *whole* plantation three times that quantity. Should the gathering be more productive, and 5 shrubs yield 1 pound of tea, the necessity for an increase of fuel will only be to the extent of 3-5ths of the above mentioned quantity, and in that case each will require 672 *pikolans* fuel besides 16,000 pounds of charcoal.

242. A bamboo shed must be built for the storing the wood in with a flooring of mats made of bamboo. It must be large enough to stow away 20 *toembaks* or 480 *pikolans* of wood, to within 2 feet of the roof; there should be a door on one side for taking out the wood, and on the other, one for bringing it in through; the oldest wood is then used first; previously to placing the wood in the house, it should be exposed to the sun and wind for a couple of days, and then remain inside for one more; again, before it is used it is put into the sun, or in the drying baskets over the fire, to be thoroughly dried ere it is made use of.

243. The two men intended for cutting the wood, can bring in (each of them, daily 1 or rather) 420 to 672 *pikolans*, in the 300 days—their wages are 120 florins per annum, that is to say, for 420 *pikolans*, being at the rate of 28½ cents each, at this rate the fire-wood becomes much cheaper in many places than it otherwise could be.

244. The quality, particularly of black tea, depends chiefly upon the use of the best charcoal, for bad charcoal damps it; it is necessary therefore to use Chinese charcoal ovens, and the charcoal itself must be burnt after the Chinese method, and from the hardest kinds of wood. The spot for making the charcoal should be selected close on the side of the forest.

245. For a plantation yielding ℔s. 100,000 of tea, five charcoal ovens are necessary; they should be, as far as is practicable, placed against a sloping bank of a stiff clayey soil, and close together, then a bamboo roofing is made to each, and lastly the whole is surrounded by a water-course from top to bottom. Whenever the clay soil selected

* A load.

† A measure of factory 12 feet long, 1¼ broad, 6 high.

fails to be of the best kind, a wall is built to the extent of half a brick in thickness, for which purpose 2,800 bricks and 28 tons of lime are required.

246. The ovens must be numbered from 1 to 5: they should be filled, one on each consecutive day, according to its number. On the sixth day, the coals are taken out of No. 1, must be cleaned and placed on a platform under a shed, and the oven refilled, &c. &c.; three men bring in four-fifths of a *toembak* of wood, that is, thirty-two logs, each five feet in length and half a foot in diameter or thinner, but not so much as two inches in the diameter, and not shorter than five feet; it must be green wood; each oven should be filled with logs as uniform in thickness as possible.

247. To produce ℔s. 100,000 of tea, ℔s. 100,000 charcoal, by a tolerably close calculation, is requisite; each oven can turn out, from the heavy sorts of wood, daily at least ℔s. 626 of charcoal, thus within a space of 200 days ℔s. 102,570 of charcoal can be obtained. For a harvest of 1 ℔. of tea from five trees, ℔s. 160,000 of charcoal will be required, therefore it is better to lay down two places for preparing the charcoal each containing two ovens, which, attended by four men at each, would produce ℔s. 164,112 within 297 days.

248. No more than four-fifths of a *toembak* of wood is put into each oven: the wood should not be placed lying down, but on the contrary, in an erect position, that the moisture may run out—two pieces of wood must not therefore be placed one over the other. The entrance is then stopped up, and a piece of wood about an each thick placed over each chimney; the fire is kindled, and if in a day and a half to two days after the two pieces of wood have become cooled, then both the mouth of the oven and the chimney are plaistered with clay and made air-tight; further, the charcoal is then allowed two days to become extinguished; from the very commencement, whenever the roofing on the entrances or the chimneys crack, the crevices should be immediately closed by plaistering them with the glutinous exudation of the bark of the *Waroe* tree; if the charcoal be of good quality, it should chink like porcelain, if otherwise it has a dead sound.

249. A place for preparing charcoal having 50 ovens requires the attendance of five men during the year; three cut wood and des-

patch it, two fill the ovens, empty out the charcoal, and plaister the roofing, &c., as required, &c. &c., the others despatch by harvest time 1 *pikolan* per day—thus the *pikolan* of lbs. 65 costs 19½ cents, and with the cost of transit 25 cents. It is advantageous therefore in delivering out the charcoal to adopt the course above pointed out.

Chapter XVI.

On Thinning and Pruning the Trees.

250. In the commencement of the third year after planting, that is, in January or February, the harvest commences, previous to which a pruning and cleansing of the trees takes place at the same time they are thinned; from the end of July to the beginning of August, the harvest is brought to a close—this takes place annually. If the planter allows delays in working the system pointed out, a certain loss arises in tea cultivation, but otherwise it is a rich source of profit.

251. After the lapse of two years the first harvest commences. Some judgment is necessary in fixing on the first day with a view of its being finished by the end of July; three or four months before the harvest begins, another lopping of the trees takes place, notwithstanding which the branches still shoot out, and produce a quantity of matured leaf.

252. By the time the leaves are matured and the rains of Nov. and Dec. have set in, the branches have grown out luxuriantly; therefore in January and February many young leaves have made their appearance, these are then gathered previous to the pruning—this is the first gathering: every year this takes place.

253. One day before the pruning, this first gathering takes place, sometimes even three or four days before but never earlier, for in that case the harvest would be injured.

254. If about ten or twelve days before the pruning time the plants should happen to be covered with young leaf, they should not be gathered; the planter must, in no case, desire, by an early gathering, though the tea be good, to increase the harvest.

255. The gathering should take place in one park at a time; if there be a scarcity of leaf, the collecting may go on in three or four

parks, but never from more;—three or four days before the gathering commences, and on every day thereof, a regular watch must be kept.

256. The plucking and manufacturing of both black and green tea take place in precisely the same manner as during the regular harvest; the top leaves by themselves, the fine and centre ones together: these last and the coarser kind the people must separate by passing through a sieve and picking: then it remains but to have the working materials properly cleansed and set aside.

257. The planter must consider the first gathering of great importance, that he may keep the process in the recollection of the people, and give further such instruction as may be required.

258. The day after the first gathering, pruning goes on in the park; should it have taken place in three or four at the same time, the parks are pruned in succession; eight men are sufficient for that purpose; it is better to employ eight or even fewer pruners, provided they are expert, than to employ more hands, and these less skilful.

259. The pruning, after the first year, is carried on only in two gardens at a time, for instance in garden No. 1, then in garden No. 2; the following day in garden No. 3 and in garden No. 4. The day previous the pruners are instructed; the planter does not allow them on the day the pruning commences to prune altogether, but each man has a separate row to himself; once more he receives instructions, and then goes on pruning his row under the superintendence of the overseer. The following day all the 8 pruners commence work at the same time.

260. The pruning is done by rows; for instance, if the pruner of row No. 1 has finished it before the pruner of row No. 2 has finished his, he must not assist No. 2, but proceed to row No. 9 at once. He is at liberty, however, then, to prune two rows consecutively; but, as the day's work closes, and the last rows are being finished, the men may then assist each other.

261. Every successive day one park should be pruned, not even a dozen trees should be allowed to remain undone till the following day: should it be apprehended that in any particular quarter delay may occur, this should be guarded against by providing assistance

in good time from those gardens where the work has been finished early.

262. The planter must excite rivalry among the workmen of each garden, and further amongst those of one garden with another, then they will be able to get through their work without assistance, for the work is not heavy, boys can prune as expertly as men;—the regular course of the work depends upon the Superintendent; every irregularity during the pruning time is prejudicial to the gathering, and therefore destructive to the harvest.

263. The Superintendents inspect each park the day after the pruning; they direct every thing to be put in order, particular attention being paid to the thorough cleansing and weeding round each tree; cleanliness, especially in the harvest time, is of the greatest consequence; the earth around each is in the first place loosened and then carefully heaped up, and pressed about the tree; then round every two or three rows of trees the loppings are heaped up in thick rows; not however in contact with them but parallel.

264. The planter should place considerable value on these cuttings or loppings, for what with dew and rain the moisture which runs off them speedily ferments and forms the best possible manure for tea lands; it improves the flavor of the produce; after three years the improvement is easily perceived; for this reason old tea lands are renewed by replanting, but are never abandoned.

265. Plants properly lopped and therefore healthy, are pruned when about a foot and a half high for the first time, and then annually. When they have grown to a height of two and a half feet another pruning takes place. Most of the plants at an height of two feet and some few at two and a half. The branches shoot out from half to three-quarters of a foot, the plants therefore must not be pruned higher, otherwise it becomes difficult for the gatherers to get at all parts of them; in lands with a sunny aspect you must be guided by experience.

266. If the lopping be neglected, or the plucking, which is the same thing, take place unseasonably, the plants become straggling, and grow too conical, and consequently top-heavy, many smaller branches shoot out below, growing close together, and bearing no leaf, the wood of which becomes heavy, grey, spotted with white and mouldy

—the plants inwardly are poor, and bare of leaves—these then should be pruned at a height of one and a half feet.

267. For the regular and irregular pruning there are four rules, which apply equally to all, for instance—A. the time of commencement of the same—B. the pruning upwards—C. the using of sharp pruning knives, and D. the freedom as regards pruning.

268. The pruning should not commence earlier than the middle of January, or even a little later, so that it may take place just as the rainy season breaks up.

269. The pruning should be *upwards*, not by clipping off the tops of branches, for without care they are liable to split, the rain soaks in and injures them.

270. Good and sharp pruning knives should be used, to facilitate the cutting, and thereby prevent as much as possible all shaking and rough handling of the tree, each pruner ought to be supplied with a sharpening stone, for use when required, and the day's work being finished, the pruner must not quit the plantation without having first put his pruning knife in order for the following day's operations.

271. There is no particular height at which the trees should be pruned, and supposing the average height to be about two feet; though there are others only eighteen inches high, still they should be pruned some two or three inches to cause them to shoot out.

272. Annually, as the time of gathering comes round, the trees are found to be ill grown and mishapen, their branches irregular, the leaves hard and growing closely together, full of dust and dirt, covered with dead insects, and altogether appearing of deep green and in an unhealthy state, so that without the operation of pruning, they would never shoot out as required.

273. The trees must never be so pruned as to leave them perfectly leafless; they should always be left on to some extent, even to portions thereof, for they act as channels for conveying the rain and dew for nourishing of the plant.

274. The ordinary *pruning* scarcely deserves to be styled pruning: it is rather, a cleaning, trimming, cleansing, and thinning out of the plants.

275. In order to pursue well, quickly and lightly, the knife should be taken in the right hand ; and with the left as many twigs grasped as can be firmly held by it, when having turned the same towards you, they are to be at once cut off in an upward direction; this is repeated, the plant is neatly trimmed, air is given from below, all creepers are pulled and thrown away, all the small dry twigs and branches are cut off to within two eyes, and the knotty and crooked ones to within one foot more or less. The decayed leaves are cleared off, and the old ones pulled off with the hand, without however making the plant too bare.

276. Towards the close of the day's work the overseer having had the grindstones placed alongside of each other, sees that the pruning knives are properly cleaned and sharpened by the pruners for the following day; further, during the course of the day he must take care, that the workmen have been careful in their work, and placed the clippings tidily in rows as they have gone on, &c. &c.

277. Such plants, as may require an unusual pruning, must be cut down at once to eighteen inches; they are allowed annually to run up untill they are about two and a half feet high; all branches and twigs will not allow of this; the pruning knives now require to be firmly examined and firmly fixed in their handles, as they frequently separate, on account of the thickness of the branches that have to be cut.

278. When pruning down to one foot and half all must be at at once cut off to that mark; when it so happens that a branch is found, having two or three straggling shoots upon it, those should be all cut off, provided it leaves the branch about a foot and half in length; but if it should leave the branch only a foot and quarter long, in that case, the shoots are left in but cut, leaving only an inch or an inch and a half of them; the plants are then trimmed and rounded off, and finally, whatever remains to be done, is finished off in the same manner as at the general pruning.

279. From 12 to 14 stout, hard-working laborers are necessary. In this extra or unusual, though simple pruning, every day, say for a park of 2,857 plants, the planter must carefully watch and see that the work is not overdone, for the workmen are very apt at times to hack away until they have nearly cut the plant down to the

ground; if the work is well done, the planter will have the satisfaction to see the plants bud in 15 days, in 10 more they will sprout out, and by the thirty-fifth day the leaves are fit for plucking, but still they are not yet to be plucked.

280. Plants, well looked after and cultivated, become in from 3 to 10 years very heavy in wood below. According to the nature of the soil, the produce thereby decreases; if this happens, then the following year after the pruning, the plough must be used, should that not avail, again the following year an extraordinary pruning must take place.

281. These plants are thus pruned, in the former manner, as those which have been badly taken care—with this difference, that they are cut down to one and a quarter. In 35 days after, the picking or harvest takes place; during this harvest the plants are run up as much as can possibly be done to 2 or 2½ feet high, and then the annual pruning takes place as before, until they again require an extra one.

282. The quality of the tea the first time, after an extra pruning, is not so good, but it improves at each gathering; and by the fourth, it is as good as at first. In China, where this system of pruning and extra pruning is adopted, as above related, the plants or trees produce for a period of from 60 to 80 years.

283. In anticipation of the gathering it is necessary that 2 or more ware-housemen be engaged, and daily instructed in the nature of the work that will be required of them.

Chapter XVII.

On gathering the leaves for Tea.

284. At the lapse of 35 days the first gathering may be commenced upon; in cold districts a little later; the 10 first parks of the plantation should be finished by taking the gardens 2 and 2 or 3 and 3 at a time in each day, according as the planter may have arranged this at the pruning time; for the gathering is regulated by the latter operation; the planter should endeavour to commence gathering by the first of March, and thus avoid the heavy rains.

285. Four gatherings take place in each garden; each gathering lasting 35 days, which, together with the pruning-time, 175 days;

with the view of obtaining healthy shoots the gatherings are retarded generally, particularly the interval from pruning until the first gathering; this prolongs the harvest well on to 190 days, commencing on the 24th January with the pruning, and on the 10th March with the gathering, is considered favorable; the planter must nevertheless always exercise his own judgment in this matter.

286. Gathering during rain is very injurious to the flavor of the tea; dampness moreover is apt to cause it to lump, by the leaves sticking together; and while there is no sun the cylinder cannot be worked, nor the tea well shaken; the quality is therefore very inferior.

287. Showers of rain during the dry season, cause no serious injury, for the leaves do not become swelled by such rain, and the sun appearing saves them; the later thus in March that the first gathering commences with reference to the pruning, so much the better for the tea.

288. The leaves which are plucked from six to eight o'clock in the mornings, are covered with dew, and are in consequence less fragrant than those taken during the remainder of the day, and which have benefitted both by the sun and wind; in general, however, the tea turns out good; it is always as well to have expert gatherers, and commence the 2nd, 3rd and 4th gatherings at eight in the morning; if rain is expected, then at six o'clock; the gatherers must always be in attendance by six o'clock in the parks.

289. Before a fresh gathering is begun upon, the planter must inspect the plants, that he may judge on what day the gathering can commence. From the 20th day after pruning until the 34th, he must examine the plant four times, and determine on the 35th if the gathering can begin on the following day; if he be an experienced planter, inspecting on the 34th and 35th days will be sufficient.

290. Under any circumstances the planters should on the 34th or 35th day make the following examination on 2 or 3 branches of each tree or plant, to see if they are ready for plucking, &c., for instance, he plucks off upwards, the 3rd leaf, then the 4th leaf, and then the 5th leaf, if the stalk remains broken off with a small piece of the leaf attached to it, even in the case of the 5th leaf, then it is too

soon, but if the 3rd leaf comes off in that manner, the 4th not so easily, and the 5th still less easily, then it is just the right time, and the gathering should at once begin on the following day, or if necessary, *one* day later. In cold situations, the leaves remain tender much longer, the labor lost under such circumstances requires consideration; sometimes a leaf ripe and fit for gathering, co off above the stalk, one that is somewhat leathery in the stalk takes off the eye with it, and another, a somewhat more leathery one, breaks off at once in the middle.

291. The planter who has experience enough to be able to judge of this by the eye, should nevertheless satisfy himself of it, for the leaves spring from the top of the shoots; and often two at a time: the age of them thereby becoming gradual.

292. To put this test into practice the leaves must be held by the middle joint of the fore-finger and thumb; then gently pulled upwards; otherwise, being a tender leaf, it breaks off in the middle.

293. The planter must hold this enquiry himself, for upon the gathering depends the out-turn of the harvest; if the leaves are too young, they are too tender for manufacturing, and the shoots in following gatherings weak; and should they be too old, the tea is sure to be inferior, and on the other hand the development of the buds is too early.

294. If any mistake occurs, it must be immediately remedied; if for instance the gathering has commenced too soon, it must cease for a few days, until the leaves in the adjoining park are ready. If it has been late the men must be set to work and the gathering proceed in two parks at the same time, so long as there are plants shewing leaves fit for plucking, after which it can be continued one park at a time.

295. Before working double tides, care must be taken that for such number of days at any rate, extra pluckers and manufacturers be provided; nothing, not even the extra expense incurred thereby, must prevent the planter from doing double work when required.

296. The gathering takes place in three divisions, for instance, the first upper leaf, which is still unfolded, together with the next and last expanded one; fine leaf, or the second and third together;

middle leaf, or the fourth and fifth together; when there happens to be a sixth or a seventh leaf, and it be tender, they should be plucked with the middle ones. The day preceding, the attention of the pluckers is once again called to the above method; the coarse leaves are picked out of the tea after the manufacturing.

297. Distinct sets of pluckers must be provided for the different kinds of leaves for both black and green teas; those for the middle leaves must be the most expert, and the Superintendent must pay most attention to this man, because he must be careful in leaving the buds for the next gathering; the gathering must be carried on in three parks at once; in one the top, in the second the fine, and in the third the middle leaves.

298. Calculating one pound of tea, for every ten trees, twelve pluckers should be provided for each kind of leaf; as each man finishes he must go and assist the others; such as wish to help those gathering the middle leaf, must be good men; it is better to employ few, but expert gatherers.

299. The plucking must be conducted in the same manner as the pruning, row after row, and be finished daily, in each park.

300. There must be two or three buds left on each shoot, or if needs be only one; the shoot is then cut off, a finger's breadth above the bud; the bud should remain protected, even if it is only by a small portion of the leaf; after the first gathering, each twig throws out two new shoots, thus more tea is produced at the second gathering; by the third gathering there are still more shoots, but the leaves become smaller; this is the case also at the fourth gathering. A judicious reserving of the buds, increases the crop; but a too great sparing of them diminishes it.

301. The leaves for black tea must be plucked together with the stalk, just under the tea, thus, first the top, then *fine*, and then the *middle* leaf, should the *middle* leaf pluckers observe no buds below the fourth and fifth leaves, then they must pluck the leaves only with the view of preserving the buds.

302. The *top* leaves, for green tea, must be nipped off, but the *fine* and middle leaves, must be plucked off upwards, without the stalks; the pluckers of the middle leaves must nip off the stalk separately, leaving two buds, and throwing away the stalk. The

fine leaf pluckers must take care that the stalk remains on the shoot, with a small portion of the leaf attached to it.

303. *Pecco* is made of the top leaves of gardens intended for black tea, and *Joosjes* from those intended for green; should the planter in consequence of a greater demand for other sorts wish to obtain them, for instance, if he wants to make *more Pecco,* or a finer quality of it, or to make more *Joosjes* than *Pecco* than the plantations in the long are able to supply, and he desires the two first, *i. e.,* more *Pecco* and a finer quality of it, he must, in that case, commence operations by gathering, *first,* the fine, then the middle leaves, and lastly the top leaves, making thus *Pecco,* and this from the gardens from which it was intended to be made.

304. When the top leaves are destined to be appropriated for this purpose, the following rule must be attended to; firstly, in both cases where more *Pecco* and finer are to be made, the pluckers of the top leaves must nip off the stalks, and be the most particular of all. Secondly, the tops must never be allowed to remain more than two days to be developed, when intended for *Pecco.* Thirdly, *Pecco,* made from the top leaves from green tea gardens, must be manufactured in the black tea factory, and *Joosjes* from leaves from black tea gardens in a *green* tea manufactory. Fourthly, the green and black tea gardens, in which the change of leaf for the manufacturing as above takes place, should be close together. Fifthly, the changing of the fine or middle leaves should not be mutual. Sixthly, in new tea-plantations, on account of the exchange, there should be no deviation from the usual course.

305. All the baskets for gathering tea in should be of the same weight; they should be fastened at the waist in front, in such manner that the leaves may be handily and with care thrown into it. They should never be placed on the ground on any account.

306. The people may pluck with both hands at a time; the hands, rather fingers, should be held as if the game of marbles was being played at, but with the thumbs lightly pressed upon the fore-finger. The top leaves can thus be finely and easily secured by the stalk, (or, in the case of green tea, leaf by leaf) between the finger and thumb, and nipped or pulled off. As the leaves are picked off they are collected in the hand. Five or six plucks being taken, they are

thrown lightly into the mouth of the basket, the men proceeding actively with the gathering; the leaves must not be held long in the hand.

307. Besides the care and attention therein bestowed by the planter during the gathering, he must recollect every now and then to call out to the people to be careful in plucking in an upward direction, not to retain the leaves long in their hands, and to leave the two buds that are required.

308. Four *djongdong* or covered baskets must be every day brought to the pluckers for the purpose of conveying away separately, the fine and middle leaves; two being taken away full, the other two left for filling. The top leaves are sent away in *sonkos*, or small baskets. The *djongdongs* or covered baskets with black tea in them may, if the weather is fine, be kept open in the plantations, but those with green tea in them must be kept shut. The leaves, both for green and black tea, should be always quickly carried away to the manufacturers.

309. The gatherers should be paid by the weight, which is reckoned in catties, and have tickets given to them; it should come to about the same as their daily pay; they can, one with another, pick at least five catties of tea per day; when fines are levied they should be from the weight, not from the money; each basket should contain only two catties; the weight must therefore be somewhat under two catties; five catties is only taken as a sort of guide to go by, for good active pluckers can gather often sixteen catties per day.

310. Two hundred and twelve tickets are necessary for each factory, making seventy pounds of tea per day, although there are already 300 of the tickets on hand: with these the gatherers are paid for the time, then in the afternoon these are exchanged for their pay in money.

311. Each time, as the leaves are brought in, they must be weighed and noted down before they have time to shrink.

When the day's gathering is finished, a memorandum of the total weights is given into the planter; if he finds any difference in it with the tickets, he must enquire into the matter and settle it.

312. If blight and insects make their appearance just at the season of the harvest, it must not in any way put a stop to the regulated

period of its commencement, and must be proceeded with : for, in the first place, they are mostly best got rid of, when they are taken off together with the leaves, and they are again afterwards sifted from them, whereas any delay would tend to injure the succeeding crop.

313. After the fourth gathering the plants shoot out very freely, but though this be the case, there must not be a fifth gathering, for it would prove injurious to the following harvest; but in warm districts, when the lands can be irrigated and the leaves are fit in about thirty days, a fifth gathering may be undertaken.

314. The practice of gathering at the end of fifteen days is objectionable, for the shoots are thrown out uneven, and the produce is not at all greater; at any rate, those who adopt this plan, must pick from two parks at once, for even then the shoots scarcely show leaves enough, although a change has taken place; further, the top and fine leaves are picked as usual, and for the middle leave only the middle. The period of commencing and finishing the harvest remains just the same.

315. The harvest cannot be continued throughout the year, as that would exhaust the plants too much, and produce but a small crop.

316. If the cultivation of tea is to become a branch of industry, the harvest throughout would be impracticable.

317. It would be a good plan to make four trials; to effect this there ought to be five plantations adjoining each other, each containing 100,000 trees; they should be all laid out at the same time, all planted from seed, and the seeds produced from one and the same garden. The first garden then, is for four gatherings, the second for five, the third, is to be plucked at the end of fifteen days, the fourth the whole year through, and the fifth again for four more gatherings; but then, the 1st, 2nd, 3rd, and 4th, must be planted four feet square, and the 5th, three feet; in 10 or 15 years it will become the best plantation.

(To be Continued.)

Monthly Proceedings of the Society.

(Thursday, the 11th January, 1849.)

The usual monthly general meeting was held in the Society's Rooms, Metcalfe Hall, on 11th January, 1849.

Dr. Charles Huffnagle, Vice-President, in the chair.

Elections.

Lieut. Charles Holroyd, Mr. William Cockburn, Baboo Joygopaul Bysack, Capt. P. M. Taylor, Mr. R. H. S. Campbell, and Baboo Gobind Chunder Sen.

Proposals.

Capt. R. Troup, 63rd N. I., Commanding 2nd Oude light infantry,—proposed by Dr. Alexander Greig, seconded by the Secretary;

E. J. Emin, Esq., Calcutta,—proposed by Mr. O. J. Elias, seconded by Mr. P. J. Sarkies;

Edmund Lodge, Esq., Inspector of Government Schools,—proposed by Mr. W. Cragg, seconded by the Secretary.

Presentations.

The following presentations were announced to the library, garden, and museum :—

1. *Icones Plantarum Indiæ Orientalis:* or Figures of Indian Plants. By Dr. R. Wight. Part 11, vol. iv. *Presented by the Government of India.*

2. Journal of the Asiatic Society of Bengal, Nos. 195 and 196. *Presented by the Society.*

3. The Journal of the Indian Archipelago, for November and December 1848. *Presented by the Editor.*

4. Two copies of the same work, and for the same period. *Presented by the Government of Bengal.*

5. Two well executed framed drawings of his cotton-cleaning machine, and model cleaning house. *Presented by J. H. Mather, Esq.*

6. A quantity of melon seed of sorts, and of "*Ăăl*" seed *(Morinda multiflora,* Roxb.*)* *Presented by Colonel Ouseley.*

Col. Ouseley mentions, that the root of the "*Ăăl*" is largely employed in Central India for dyeing purposes: the best *Khurwah* cloth is dyed with it. The roots require three years to attain perfection.

Col. Ouseley also sends three maunds of fine paddy seed for trial in Arracan, and a maund, in husk, of coffee seed for transmission to Major Jenkins, in Assam.

7. Another sample of cotton raised from Dr. Wight's Mexican seed, in the Government Experimental Garden at Burkaghur (Chota Nagpore). *Presented by Colonel Ouseley.*

8. A supply of acorns of the Darjeeling oaks. *Presented by Dr. Campbell.*

Dr. Campbell forwards this supply (through Dr. Falconer) in compliance with an application preferred to him some months ago by the Society, with a view to the introduction of the Darjeeling species of oak into England. Dr. Falconer reports, that the seed has unfortunately reached in a state which almost precludes any chance of germination. Dr. Falconer adds, that about a dozen of the heavier and least unpromising acorns were sown in the Botanic Garden, but have not yet shown any signs of germination.

Mr. George Wood submitted for exhibition an exceedingly well grown flowering plant of *Cereus truncatus*, another of *Lilium longifolium*, and cut specimens of *Bignonia chirere*.

Annual Reports.

An outline of the several objects which have come under the notice of the Society during the past year was submitted. The summary states, in allusion to the internal economy of the Society, "that while not claiming a total exemption from the consequences resulting from a year of almost unprecedented distress, both social and commercial, the Society has suffered as little, or perhaps less, than most other public institutions in the country."—That "the number of elections during the year has aggregated 59, or 3 less than that of 1847,"—and that after deduction of life and honorary members, and absentees, the number of paying members is 415. The report pays a brief but just tribute of respect to the memory of its late President Sir John Peter Grant; refers to the countenance and support it has already received from its Patron, the Earl of Dalhousie; expresses its satisfaction at the nomination of Sir Lawrence Peel to the Presidential chair; and then passes on to the consideration of the principal objects which have engaged its attention during the last twelve months.

The report of the Finance Committee and its appendices, were next brought forward. The Committee give, on the whole, a favorable account of the monetary affairs of the Society, and close their report with the remark that while the vested fund (which now amounts to Rs. 19,200) has been considerably increased during the past year, the liabilities against the Society scarcely exceed in amount the cash balance in the Bank of Bengal.

The reports were transferred to the Committee of Papers for publication in the Journal.

Floricultural Exhibition.

A list of prizes, amounting to Rs. 108, awarded at the last quarterly show of 1848, held on 30th December, was laid on the table. The following are the remarks appended thereto :—

"This exhibition was a decided improvement on those of the same month in 1846-47. *Chrysanthemums*, *Dahlias* and *Euphorbias* were well represented. The collection of *Phloxes*, *Nasturtiums*, *Maurandyas*, *Ipomœas*, Balsams and Pinks were tolerably good, especially the Balsams for this season of the year. Of *Petunias*, *Portulacas*, *Verbenas*, *Salvias*, *Campanulas*, *Pentstemon* and *Linarias*, the collection was limited. Sweet-peas, Heartsease, and Larkspurs were not brought forward, though included for prizes. There were several well-grown specimens of *Oxalis*, *Antirrhinums*, and *Olea fragrans*. The *Justicias* and *Begonias* were poor; but this deficiency was relieved by the appearance of some very pretty plants of *Bletia hyacinthina*, a well grown *Rondeletia*, a very superior plant of *Plumbago rosea*, and cut specimens of *Combretum grandiflorum*. Among the few novelties may be mentioned a cut specimen of a creeper from Assam, a *Trichospermum*.

Dr. Falconer, W. H. Elliott, Esq., Lieut. Staples, and Col. Handscombe selected the specimens, and Sir Lawrence Peel distributed the prizes to the amount of 100 Rs.

Election of Office Bearers and revision of Standing Committees.

The meeting next proceeded to the nomination of Officers for the current year; and on examination of the returns, it was found that all the Officers of the previous year had been unanimously re-elected.

The revision and strengthening of the Standing Committees was then entered on, and gave the following result :—

Sugar.—Messrs. G. U. Adam, James Cowell, W. Haworth, S. H. Robinson, and T. F. Henley.

Cotton.—Messrs. Joseph Willis, W. Earle, G. U. Adam, and C. Huffnagle.

Silk, Hemp and Flax.—Messrs. Joseph Willis, G. T. F. Speede, J. W. Laidlay, W. G. Rose, and Capt. A. Thomson.

Coffee and Tobacco.—Dr. Strong, Messrs. W. Storm, James Cowell, and Colonel Sage.

Implements of Husbandry and Machinery.—Colonel Sage, Messrs. H. Mornay, J. M. Vos, J. H. Mather, and T. F. Henley.

Oil and Oil Seeds.—Dr. Mouat, Messrs. W. Haworth, H. Mornay, James Cowell, and Baboo Ramgopaul Ghose.

Grain Committee.—Messrs. Joseph Willis, W. Storm, W. Haworth, C. R. Prinsep, G. T. F. Speede, and Baboo Ramgopaul Ghose.

Nursery Garden Committee.—Messrs. J. W. Laidlay, W. G. Rose, W. Storm, W. Earle, and C. Huffnagle.

Fruit and Kitchen Garden Committee.—Messrs. G. T. F. Speede, W. G. Rose, J. W. Laidlay, and Baboo Pearychand Mittra.

Committee of Papers.—The Revd. Dr. Duff, Colonel Sage, Mr. J. W. Laidlay, the Hon'ble Mr. Bethune, and Dr. Falconer.

Finance Committee.—Messrs. M. S. Staunton, J. W. Laidlay, Charles Huffnagle, and A. Turner.

The appointment of an additional Committee to be termed the "Floricultural Committee," was also agreed to. This section will regulate the period of the flower shows, draw up the lists of prizes, and act as judges. The following gentlemen were requested to afford the Society the benefit of their services by joining this Committee, viz.:—

Dr. Falconer, Mr. W. H. Elliott, Col. Sage, Lieut. Staples, and Mr. H. Alexander.

Proposal of a Prize to the inventor of an apparatus for separating cotton wool from the seed, unrestricted by any particular mechanical principle.

Read the following letter from H. Mornay, Esq., suggesting the offer by the Society of another prize for an efficient cotton-cleaning machine:—

Calcutta: 11th December, 1848.

Jas. Hume, Esq., *Honorary Secy. Agri-Horti. Socy. of India.*

Dear Sir,—With reference to the prizes which have lately been awarded for an improvement of the Indian *churka*, it appears to be the general opinion of the members of the Society, that although the apparatus is so far successful in its action as to be decidedly superior to that of the native instrument as ordinarily constructed—it does not hold forth, in its present state, much prospect of superseding it—and that there is yet much room for improvement before there can be any hope of such a contrivance coming into operation on the large scale.

Under these premises, I am led to anticipate that the Society may deem it expedient again to assign one of its medals to be awarded to the inventor of a further improved machine, calculated to advance the practical object in view. In this event I would beg to suggest for the consideration of the Society whether it would not be desirable to remove the restriction hitherto placed on the character of the apparatus allowed to compete for the prize. It appears to me, that so long as the machine is a practical and useful improvement, likely to lead to beneficial results, the particular mechanical principle upon which it is constructed can be of no importance, and that any restriction in this respect is calculated rather to limit the probabilities of success and retard the real object which it is desirable to attain.

Perhaps something to the following effect would be in accordance with the views of the Society.

"To any person who may succeed in contriving an apparatus for 'cleaning' cotton which shall meet the approval of the Society as likely to lead to practical benefit in being instrumental to the eventual supply—as far as its pre-

paration is concerned—of a superior quality of cotton to the several markets for which it is destined."

The Society's Gold Medal.

I submit the crude idea which you will no doubt be able to throw into a more clear and proper form in case this view of the matter meet with the approval of the Society.

HY. MORNAY.

P. S.—I may be permitted here to state that, although as a member of the Committee upon the Cotton-cleaning Machines, it was my conviction that the improved machine owed its superior actior in cleaning *solely* to the accuracy of its construction and to no peculiar novelty in its combination entitling it, under the prescribed conditions, to the prizes offered; it was a source of gratification to me that Mr. Mather's labors in attempting to improve the *churka* were deemed of sufficient merit by the Society to warrant their according their rewards to that gentleman. H. M.

Resolved,—That Mr. Mornay's communication be referred for report to the Committee for Implements of Husbandry and Machinery.

In connection with the above, the Secretary informed the meeting that upwards of ten years had elapsed since Major Jenkins had transferred to the Society the sum of Rs. 500 (which had so lately been voted to Mr. Mather) first, to be given as a prize to the discoverer of an efficacious mode of reeling off the Eri silk from the cacoon, and afterwards, failing that, for an improvement on the Indian *churka.* That the interest on this sum having now accumulated to Rs. 250, he begged to propose a reference to Major Jenkins, for any suggestions he might wish to make in regard to the disposal of this amount.

Resolved,—That the reference be made accordingly; and that a copy of Mr. Mornay's letter be also forwarded for Major Jenkins' information.

Report on Wheats, the produce of the Nerbudda.

Extracts of a letter from Professor Royle, regarding some large samples of Nerbudda wheats, which had been forwarded by Col. Ouseley to Sir Henry Willock, were read to the meeting. Dr. Royle mentions that these samples had been transferred by Sir H. Willock to him to have reported on, and he submits for the information of the Society copy of a report from Messrs. James and Sons. "With respect to the *value* of these wheats"—observes Dr. Royle—"there is no manner of doubt, in fact they are considered the finest specimens in the London market, and the soft wheat ("*Pissee*") valued at from 4 and 6 shillings *above* the highest prices of the day." Dr. Royle intimates that he sent some of those wheats to Manchester, and the dealers were quite surprised at their general fine appearance. Dr. Royle has distributed these grains largely for the purposes of sowing, and promises to communicate the result.

Communications on various subjects.

The following letters were also submitted :

1. From Dr. R. Wight, Superintendent Government Cotton Farms, Coimbatore, intimating that he is prepared, in communication with Government, to place at the disposal of Mr. J. G. Bruce, of Cawnpore, 40 or 50 maunds of American cotton seed, to aid him in his endeavours to introduce the culture in Bundelkund.

The Secretary mentioned he had lost no time in forwarding copy of Dr. Wight's letter to Mr. Bruce.

2. From J. H. Mather, Esq., returning his best thanks for the award of the Society's gold medal and 500 Rupees for his improved *churka;* and submitting, in compliance with the suggestion of the Special Committee, a memorandum descriptive of this machine. Referred to the Committee of Papers.

3. From Major Jenkins, suggesting that the Society place themselves in communication with Messrs. Ransome, of Ipswich. Major Jenkins observes,—"I really think the Society might do some good by making themselves the medium of publishing the principal inventions in agricultural instruments, and obtaining, at least, lists and drawings of machines with their prices from the makers, which I suppose they will always be most ready to furnish the Society with."

Resolved,—That the suggestion be adopted, and that it be referred to the Implement Committee to state how it may best be effected.

4. From Arbuthnot Emerson, Esq., dated 11th January, stating that he has just received per *Oriental* a case containing some of the choicest of the English Horticultural seeds, a part of which is at the command of the Society, if required.

The best thanks of the Society were accorded to Mr. Emerson, for this acceptable present.

5. From W. Seton Karr, Esq., Under-Secretary to Government of Bengal, requesting the Society's co-operation in obtaining a quantity of "Bengal seed Rice" for the Government of Bombay.

The Secretary mentioned that Baboo Ramgopaul Ghose had offered to aid the Society in meeting this application.

6. From Mr. James Carter, London, advising despatch by the Overland Mail of the *dahlia* bulbs and fruit seeds ordered by the Society.

The Secretary mentioned that the bulbs had been planted out in the Society's garden, and a large proportion of the fruit seeds distributed to members in Behar and the Upper Provinces.

7. From Lieut. N. A. Staples (Artillery), proposing, for the consideration of the Society, that a longer notice be given to competitors of the various sorts of plants for which prizes will be awarded at the periodical flower shows. Referred to the Floricultural Committee.

In connection with the above, the Secretary suggested to the meeting the propriety of inviting amateur gardeners to exhibit at the monthly general meetings, plants in flower of a rare description, such for instance as those submitted by Mr. Wood, which might not be in blossom at the period when the shows are held; and that silver medals, or other prizes, be awarded to the exhibitor of the largest number of such within, say six months, and to the second largest exhibitor within a like time, and so on. This would not only add to the interest of the meetings, but enable the Society to judge of the merits of various plants which could not otherwise come within its cognizance.

Agreed,—And that the matter be referred to the Floricultural Committee for the arrangement of the details.

Before the meeting separated it was agreed, that the Anniversary dinner and Horticultural exhibition be held on such day as might be named by the President, due notice of the same being given.

(Thursday, the 8th February, 1849.*)*

William Storm, Esq., Vice-President, in the chair.

Elections.

Capt. R. Troup, Messrs. E. G. Emin, and Edmund Lodge.

Proposals.

R. J. R. Campbell, Esq., Merchant, Calcutta,—proposed by Dr. Huffnagle, seconded by the Hon'ble Mr. Bethune;

Baboo Kassinauth Chowdry,—proposed by Dr. Strong, seconded by the Honorary Secretary.

Presentations.

1. The Bengal Sugar Planter, by S. H. Robinson. *Presented by the Author.*

2. Journal of the Asiatic Society of Great Britain and Ireland, No. 18. *Presented by the Society.*

3. Journal of the Asiatic Society of Bengal, for Nov. 1848. *Presented by the Society.*

4 Two bales of raw cotton from the N. Eastern district of Assam, the Muttock Division. *Presented by Major Jenkins.*

The Secretary informed the meeting that, as suggested by Major Jenkins, he had transferred a moiety of this *kupas* to Mr. Mather to be divested of its seed by his *churka.* That on its return by that gentleman it would be again submitted to the Society with a report from the Committee.

5. Two small boxes containing Chiddam wheat, chevalier barley, and potato oats, forwarded by Dr. Royle from the India House, and received by the last Steamer.

Dr. Royle states, that the lateness of the season prevented his sending any cereal grains, as originally contemplated, by the August Steamer; and that as the present supply would arrive too late for sowing, he would recommend its being kept till next season (October), with the view of ascertaining if the seed will retain its vegetative power for one year, if, as in the present instance, it reaches its destination in good condition. Dr. Royle adds, "but we have no such wheat as the *Pissee* wheat of the Nurbudda. It would be very desirable to introduce this into the upper parts of Bengal, where the climate is probably more favorable than near Calcutta."

The Secretary mentioned, that Dr. Royle's recommendation as regards the English grains, would be attended to; and he was glad to add, that through the assistance of Col. Ouseley and the Bhauglepore Branch Society, his second recommendation had been anticipated.

6. A case of plants from Trinidad. *Presented by R. W. G. Frith, Esq.*

A report from the Gardener stated, that of these plants, 26 in all, 11 have arrived in good condition, 5 in a sickly state, and 10 quite dead.

7. Some cut specimens of flowers—*Poivrea coccinea, Bignonia cherere*, roses of sorts, &c., from Mr. George Wood's garden, were placed on the table; also a few plants of *Linarias* and *Antirrhinums* from the garden of Mr. Collins.

Horticultural Exhibition.

A schedule of the prizes awarded at the first quarterly show of vegetables and fruits, held on 5th of February, was submitted, with the following remarks:—

"This show was, on the whole, equally as good as that of last year. The entire hall was filled with well grown vegetables of all sorts. There were 6 or 7 kinds of cabbages, the early York, sugar-loaf, Savoy, drumhead, red, brocoli, kale, &c., 4 or 5 kinds of turnips, and as many of peas, including a gigantic sort, termed the "Victoria." Of potatoes there was a better display than last year; and the celery showed a decided improvement, the heads being better blanched, firmer and heavier, and the collection larger than has hitherto been submitted. Of cauliflowers, the collection was not, perhaps, greater than at the first quarterly show of 1848, but the specimens were altogether better grown, nearly all being equally good, with firm compact heads. There were several good baskets of beans, including the "Windsor" —a variety seldom grown by the native gardener, a larger prize than is usually accorded was given to the owner of the best basket, but he was not considered deserving of the silver medal, which had been offered for a really good specimen. The same remark is applicable to peas, potatoes and turnips"

The fruit department showed a greater variety than usual at this season of the year, including among other kinds out of season—the custard-apple, pine-apple, shaddock, and rose-apple. A few fine pomegranates were submitted, and some well-grown oranges, raised from China stock, in the neighbourhood of Calcutta.

The range of indigenous vegetables offered no particular novelty. There was a large assortment of beans, and some good specimens of the Tenasserim yam.

Mr. Laidlay and Baboo Pearychand Mittra selected the prize specimens, and Mr. Rose distributed the amount, Rs. 189.

Floricultural Exhibition.

A short report from the Floricultural Committee was next read. The Committee submit a list of prizes for the first quarterly show, which they suggest being held on the 1st of March. They add, that they are taking into consideration the communication from Lieut. Staples, which was laid before the January meeting, as also the details regarding the proposed monthly shows of plants of a rare description, and hope to submit a report thereon at the next general meeting.

Testimonial to the late President.

The Honorary Secretary drew the attention of the meeting to the subscription raised last year for a portrait of the late President. The sum subscribed on that account was Rs. 1,873, of which Rs. 1,769 had been collected and deposited in the Bank of Bengal. The members were aware that when this subscription was set on foot Sir John Grant was about proceeding to England, and had promised, on his arrival, to sit for his portrait. His death, unfortunately, prevented that arrangement being carried into effect; and from the enquiries which he (the Honorary Secretary) had since instituted it would appear there was no likeness existing from which a good portrait could be taken. Under these circumstances, he would submit to the meeting, whether it were not desirable to appropriate the amount to some other purpose whereby the name of the late President might be perpetuated; and he would suggest that, with the consent of all the subscribers, the sum actually realised be at once invested in Company's Paper, and that the accruings of interest therefrom be applied to the manufacture of a medal to be styled the "Grant medal," to be awarded for such objects as might hereafter, from time to time, be determined on. The meeting fully concurred in this suggestion, and the Secretary was accordingly requested to circulate the proposal among all the subscribing members to the testimonial.

Cotton-cleaning Machinery.

Read the following letter from Major Jenkins, to the Secretary, in reply to the communication of the Society, made in accordance with the resolution of the last general meeting :—

My dear Sir,—I have just been favored with your note of the 12th instant, regarding the disposal of the 250 Rs. interest which had accumulated on my gift of 500 Rs.

I have to thank the Society for consulting me on the subject, and beg you will mention that I am quite content to leave the matter to the discretion of the Society, and it will be perfectly agreeable to me if this sum is appropriated to some further attempt to clean Indian cotton by machinery. It seems quite evident, that our cotton, which is so very difficult of separation from the seed, cannot be cleared by hand at a rate which will allow it to be much more extensively used at home than it now is, but however inferior in some qualities, the Indian cotton would, I am persuaded, be largely employed for the coarser and stronger manufactures, if its cost of production was not so greatly enhanced by the vast expenditure of labor in clearing it of its seed. There is a vast quantity of land cultivated for cotton in this province, and as there are neither rents nor duties to be paid by the growers, in any way whatsoever, the raw cotton can be delivered at the *hauts* under a half-penny a lb., but except it be cleaned by domestic labor, the clean cotton would still bear a price that, with its inferior quality, would bar its being purchased for exportation. And though by domestic labor lacks of maunds are cleaned at a rate which scarcely is felt by the trade—yet this resource is not available for large merchants. If the cotton is ever to be used out of the neighbouring Zillahs, it must be cleared of its seed by some cheap process of machinery. I am, &c.,

Gowhatty: January, 23rd, 1849. Fras. Jenkins.

Resolved,—That this communication be transferred to the Implement Committee, to be taken into consideration in connection with the subject of a further prize or prizes for an improved cotton-cleaning apparatus, already referred to them for report.

Communications on various subjects.

The following letters were also submitted :—

1. From Dr. Campbell, forwarding an account of the distribution of prizes for country produce at the Titalya fair of January, 1849.

2. From Capt. F. C. Burnett, Artillery, dated Camp Deenanuggur, 31st January, of which the following is an extract :—" I never saw finer soil than the whole of the Jullundur Doab ; I have been in two other Doabs, and they look miserably barren plains, when the whole of our Doab is richly cultivated : I never saw finer crops in my life. The only plants I found in my travels worth mentioning were the "*Plumbago Zeylanica*" and a sort of "*Borago*," the latter very pretty, both growing wild.

" I am most anxious to get a very large supply of the seed of the teak tree, and will feel much obliged to you, if you will send *as soon as possible* (for the season is approaching for sowing them), as large a supply as you can by

steamer and bullock train. I do not mind how much I pay, as I am most anxious for the seed I never saw any thing like the manner in which the teak grows and thrives here, and I am sure it would pay Government if they were to plant all the low marshy waste land in this Doab with teak."

The Secretary informed the meeting, that it having been found by trial in the Society's Nursery, that a fair proportion of the supply of teak seed, presented a short time ago by Capt. Latter, was in germinating condition, he had despatched the greater part of it without loss of time to Capt. Burnett.

3. From S. H. Robinson, Esq., presenting a copy of his "Bengal Sugar Planter," which he has dedicated to the Society.

Resolved,—That the Society subscribe for five copies of this work, for its own library, and for distribution to Societies in England with which it is in correspondence.

4. From S. Wauchope, Esq., applying for a quantity of grass seed for introduction into the station of Kyouk Phyoo.

The Secretary intimated that he was taking steps to meet this requisition.

(Thursday, the 15th March, 1849.)

Dr. Charles Huffnagle, Vice-President, in the chair.

Elections.

Mr. R. J. R. Campbell and Baboo Kassinauth Chowdry.

Proposals.

J. B. Grisenthwaite, Esq., Darjeeling,—proposed by the Honorary Secretary, seconded by Dr. Huffnagle ;

Sir Arthur Buller,—proposed by Mr. R. M. Reddie, seconded by the Honorary Secretary ;

J. A. Burkinyoung, Esq., Solicitor,—proposed by Mr. W. G. Rose, seconded by Mr. William Cragg.

Presentations.

1. Journal of the Eastern Archipelago for January, 1849. *Presented by the Editor.*

2. Two copies of the same work for the same month. *Presented by the Government of Bengal.*

3. Journal of the Asiatic Society of Bengal, for December 1848, and January 1849. *Presented by the Society.*

4. Specimens of calf skins, tanned and dyed with the pods of the "*Teree,*" a species of *Cæsalpinia* common to Chittagong. *Presented by Mr. John Teil.*

5. A small assortment of English vegetable seeds. *Presented by Mr. Arbuthnot Emerson.*

6. Two China plum and two Bombay mangoe grafts. *Presented by Mr. F. D'Aguiar.*

7. A specimen of cotton raised at Serampore from Bourbon seed. *Presented by Mr. G. B. Vaux.*

This cotton was pronounced a fine and strong staple, and sufficiently encouraging to warrant its extended culture, to ascertain which was Mr. Vaux's object in submitting it.

8. Specimens of cotton raised at Chittagong from acclimated Mexican seed, the produce of the Coimbatore farms. *Presented by Mr. A. Sconce.*

A few plants in flower from Mr. George Wood's garden were placed on the table, namely, *Petrea Stapeliæ, Ferraria (atrata ?)*, an *Elichrysum*, and a pot of double pinks.

Floricultural Exhibition.

The Floricultural Committee submitted a list of the plants to which prizes were awarded at the first quarterly show held on the first March, accompanied by the following remarks :—

"This show was not only an improvement on the first quarterly exhibition of last year, but it may be considered as the best that has yet taken place. The hall was completely filled with plants, many of them well grown. The collection of *Phloxes, Verbenas, Portulacas* and pinks outnumbered the others. Among the *Verbenas* was a new variety, as also among the *Portulacas.* In the assortment of double and variegated larkspurs were some beautiful specimens of the rarer varieties, better than any previously exhibited. The heartsease too was an improvement on those of last year, both in size and formation. The violets were poorly represented ; and the sweet-peas were not better than at former shows. Both these plants admit of considerable improvement. There was a large assortment of the *Nasturtium* tribe, all in full flower, including one specimen of *Tropæolum Canariense.* A tolerably good collection of *Oxalis, Antirrhinums* and *Pelargoniums ;* of the latter several kinds were in flower—the *peltata, radula, Barringtonia, zonale,* &c. Of the more common order of annuals, such as *Linarias, Clarkias, Nolanas, Nemophilas, Eutocas, Candytufts, Petunias, Schizanthus, Collinsias, Lobelias,* there were many specimens ; and a few of the less common kinds, *Rodanthe Manglesii, Platystemon Californicus, Cosmea bipinnata,* double *Zinnias, Browallias, Brachycome iberidifolia,* with one plant of *Calceolaria* and another of *Campanula.* The bulbous tribe were pretty well represented in lilies, irises, jonquil, and a few well-formed cut specimens of *dahlias.* Among the orchids were *Bletia, Epidendrum, Den-*

drobium, and a few others. In the department of climbers, *Petrea Stapeliæ*, *Buginvillea spectabilis*, *Bignonia venusta*, and *Poivrea coccinea* took the lead; but there were also some other in full flower, among them, *Maurandyas* of four or five sorts, *Thunbergias (Hawtayneana* and *aurantiaca)* and *Lophospermum erubescens*. The specimens of stocks, wall-flowers, lupins and *Escholtzias* were deemed undeserving of notice. The carnation was without a representative, but there were some pretty specimens of sweet-william, the best yet brought forward. Of *Camellias* there was only one plant, and that with a single flower. *Olea fragrans* was not forthcoming. There were a few healthy plants of *Astrapœa Wallichii* and German asters; a fine specimen of *Bilbergia pyramidalis*, and several of *Euphorbia jacquiniflora* and *Begonias*.

"The competition was spirited: the produce of thirty gardens or more was brought forward, of which the *mallees* of twenty carried off prizes, in the order annexed, to the amount of Rs. 142.

"In conclusion, the Judges are glad to observe that nearly all the plants were neatly arranged according to their respective kinds; thereby adding to the appearance of the show, and enabling them to select the specimens with greater ease and rapidity. They have only further to suggest, on this head, that in future, the respective specimens of each competitor be kept separate, so as to enable them to ascertain, at a glance, by which garden the largest collection of each sort of plant is contributed; and that all *mallees* be excluded till the prizes are about to be awarded."

(Signed) H. Alexander.
" W. H. Elliott.
" N. A. Staples.

Report of the Floricultural Committee regarding the proposed monthly Exhibition of Flowers.

Read the following report of the Floricultural Committee, respecting exhibitions of rarer sorts of flowers at the monthly Meetings:—

"In continuation of their report presented at the last General Meeting, your Committee, having taken one of the subjects referred to them into consideration, have now the pleasure to submit the following schedule of prizes in connection with the proposed special exhibitions of flowers at the monthly Meetings of the Society:—

To the exhibitors during the remainder of the present year, commencing from the April meeting of the Society, of the *most valuable foreign plants*, —*perennial, biennial or annual.*

First Prize,.................... Large silver medal.
Second Prize,.................. Small silver medal.

To the exhibitors during the same period of the *most valuable indigenous plants.*

First Prize,.................... Large silver medal.
Second Prize,.................. Small silver medal.

To the exhibitors during the same period of the greatest variety of *rare foreign and indigenous plants.*

First Prize,.................... Large silver medal.
Second Prize,.................. Small silver medal.

2. Your Committee have purposely introduced a third class of prizes in order that those exhibitors, who may fail to obtain a prize (first or second) under the first two heads of exotic *or* indigenous, may have a prospect of reward for their trouble in rearing the most valuable *combined* assortments of exotic *and* indigenous plants.

3. That a correct account of the plants to be submitted at those monthly shows may be kept, your Committee suggest that a book be prepared for that purpose, the details being noted under the following heads :

[Here follows a tabular form which need not be introduced here.]

and that a report therefrom, drawn up annually by your Committee, be submitted at the General Meeting in January. Further, that in the event of only one of the members of the Committee being present at the Meeting, it shall be optional to the Meeting, to appoint any other member of the Society, who may be present, to examine and note down the details of the plants submitted, or to retain them till the following day, when they can be inspected by the Committee conjointly.

4. Your Committee would likewise recommend, that successful candidates be required to give a note of their mode of cultivating the rarest kinds of plants, or such as have not previously been successfully grown, when requested to do so.

5. In regard to the second subject submitted for their consideration, namely, the granting of a longer notice to the exhibitors at the *quarterly* shows, at the Town Hall, your Committee, while perfectly concurring in the propriety of the suggestion on this head, preferred in the communication of Lieut. Staples, read at the January meeting, regret their inability, for want of a more extended enquiry than they have yet been able to give, to carry it into immediate effect. But they hope, on the return of their colleague, Dr. Falconer, in April next, to submit schedules for the four shows of 1850, and thus, by informing exhibitors in December of one year the plants for which prizes will be awarded in the same month of the succeeding year, enable them to cultivate such plants carefully for competition. The list for the first quarterly show of the current year, which was laid before the last General Meeting, though perhaps more varied than any yet submitted, comprises, your Committee conceive, several kinds of plants which have now become almost too common to be entitled to prizes. It is therefore proposed to remove these, and several others, from the lists of next year, substituting rarer sorts, and offering larger prizes for each well grown specimen."

(Signed) H. ALEXANDER.
" W. H. ELLIOTT.
Calcutta: 15th Feb. 1849. " N. A. STAPLES.

The report of the Committee, with a few trifling additions, was confirmed.

Communications on various subjects.

The following communications were also submitted :—

1. From J. W. Dalrymple, Esq., Under-Secretary to Government of Bengal, requesting that the Society will favor Government with its opinion on the large specimen of coffee (eight or nine maunds) sent down by Colonel Ouseley, the produce of the Government plantation at Kishenpore, in Chota Nagpore.

2. From T. F. Henley, Esq., submitting a very favorable report on the above coffee, which Mr. Henley considers fully equal to first class Jamaica.

It was agreed that, Messrs. Willis and Earle be also requested to favor the Society with their opinion on the above staple.

3. From T. B. Mactier, Esq., furnishing a few particulars regarding the Government teak plantation at Bancoorah. Mr. Mactier also intimates his intention of sending the Society some seed from this plantation.

4. From Capt. Latter, late Superintendent of the teak forests in the Tenassorim Provinces, submitting a few observations on the subject matter of Mr. Mactier's letter.

5. From Mr. Teil, giving a favorable report on further tanning and dyeing experiments with the "*Teree*" pod of Chittagong, and presenting, in illustration thereof, the calf skins alluded to among the presentations.

Mr. Teil is of opinion, this pod answers admirably for the tanning of light skins and fancy leather, but he is doubtful whether it will prove suitable for heavy and stout leather, the process being a slow one, thereby necessitating a frequent change of liquor and consequent large consumption of material. On this point, however, he will be able to report with more certainty hereafter, when certain experiments on buffaloe hides, now in process, are completed.

In reference to the above portion of Mr. Teil's report, Capt. Latter drew the attention of the meeting to Mr. Snyder's patent process of manufacturing leather, so fully described in a late number of the *Mechanics' Magazine*—that for April 1848. By this method, which is extremely simple, the leather is not only tanned more equally throughout, but in less than half the time required by the ordinary process. Moreover, "a much better article is produced, a great saving of material is effected, and a far greater weight of leather obtained from the same quantity of skin."

The Secretary was requested to bring the above mentioned particulars to Mr. Teil's notice, whose report, as also the communications of Messrs. Mactier and Latter on teak plantations, were ordered for publication.

6. From Capt. F. C. Burnett, on the cochineal of the Punjaub, and on the natural features of the country in the vicinity of Deenanuggur. The following is extract of Capt. Burnett's letter, dated 13th Feb. :—

"I received your letter of the 23rd January, and am much obliged to you for having so kindly complied with my request for a supply of teak seed, I have no doubt but they will some day repay the trouble and expense caused by their carriage so far; they will arrive at the best season for putting them in the ground, and will have every advantage in point of soil and watering. I planted out a clump of teak trees from the nursery in the station, some of them were 12 feet high and only two years' growth, with leaves 2 feet long. I have not found any seeds worth sending, but I have been gratified by the sight of most of our English wild flowers growing in this part of India. Among the most common I may mention the small yellow *Ranunculus* or butter-cup, the fields are quite yellow from it; also the *Anagallis* or pimpernel, the *Dandelion*, the *Clematis*, and jessamine and wild roses in all the hedges. Peaches and apricots seem to grow almost wild, and the low range of hills are covered with the *Dodonea discolor*, which is a pretty evergreen when all the other trees are bare; there are also a great variety of *Convolvoli*. I will try to send seeds when they are ripe. I would like to try the mahogany and toon trees here, and any valuable timber trees that you have the seed of. I got a quantity of tea seed from Komaon and a large supply of the tea, which I think the finest I ever tasted."

The Secretary stated, that with the kind assistance of Dr. Macrae, Offg. Supt. of the Botanic Garden, he had been able fully to meet Capt. Burnett's requisition for seeds.

7. From A. Sconce, Esq., submitting a memorandum on the trials made by himself and Mr. Skipwith at Chittagong, on the acclimated Mexican cotton seed furnished by Dr. Wight.

Mr. Sconce remarks—"I have frequently sown foreign cotton seed, but on no occasion have I found the growth of the plants and the out-turn of the produce so successful as in this instance. Throughout the whole season (though the sowing occurred at a disadvantage, that is, some time after the setting in of the rains) the growth of the plants seemed to correspond with the climate; there was neither a surplus growth of wood nor a premature flowering, and whereas in former experiments with foreign cottons, the boles were eaten through by caterpillars, this crop turned out clean. The rate of the produce of the patch of land sown is about 2¼ maunds the acre, of uncleaned cotton."

8. From J. G. Bruce, Esq., submitting a correspondence with the Government of the N. W. Provinces, respecting the offer made by Dr. Wight, through the Society, of supplying him with a quantity of Mexican cotton seed from the Coimbatore farms for trial in Bundelkund. The Honorable the Lieut.-Governor has not only acceded to the request, but intimates that he will watch the result of Mr. Bruce's undertaking with interest, and will be glad to find it successful.

9. From W. Seton Karr, Esq., Under-Secretary to the Government of Bengal, conveying the thanks of His Honor the Deputy Governor to the Society for obtaining the seed-paddy applied for by the Government of Bombay.

10. From Messrs. Villet and Son, Cape of Good Hope, promising to despatch the Society's annual consignment of seeds in all April.

Two reports from the Society's Gardener on the germination of English flower seeds and cereals were also submitted.

Before the members separated, the Honorary Secretary notified that, in accordance with the resolution of the last meeting, he had circulated to the resident subscribers to the Grant testimonial the proposition to transfer their subscriptions to a common fund, the interest on which should be appropriated for the manufacture of a gold medal, to be styled the "Grant medal," and that, with one exception, all had concurred in the proposition.

(*Thursday, the* 12*th April,* 1849.)

William Storm, Esq., Vice-President, in the chair.

Elections.

Sir Arthur Buller, J. B. Grisenthwaite, Esq., and J. A. Burkinyoung, Esq.

Proposals.

Major L. H. Smith, Commanding 1st Irregular Cavalry,—proposed by Lieut. J. C. Brooke, seconded by the Honorary Secretary;

John Johnson, Esq., Calcutta,—proposed by Mr. W. Stalkart, seconded by Mr. S. P. Griffiths;

W. C. Lochner, Esq., Civil Service, Burdwan,—proposed by the Honorary Secretary, seconded by Mr. W. Storm;

Dr. John Row, Superintending Surgeon, Dacca,—proposed by Lieut. N. A. Staples, seconded by Mr. J. W. Laidlay;

J. G. Waller, Esq., Solicitor,—proposed by Dr. Huffnagle, seconded by the Honorary Secretary;

Dr. W. H. Bradley, Jaulnah,—proposed by the Honorary Secretary, seconded by Mr. W. Storm;

Capt. G. M. Hill, Deputy Pay Master, Jullundur,—proposed by Capt. F. C. Burnett, seconded by the Honorary Secretary;

Capt. G. C. Armstrong, Ramghur Light Infantry,—proposed by Col. J. R. Ouseley, seconded by the Honorary Secretary.

Presentations.

1. Maddock's Florist's Directory. *Presented by Mr. R. Wood, Junior.*

2. Journal of the Indian Archipelago for Feb. 1849. *Presented by the Editor.*

3. Two copies of the same work for Feb. 1849. *Presented by the Government of Bengal.*

4. Journal of the Asiatic Society of Bengal for Feb. 1849. *Presented by the Society.*

5. Report of the London E. I. and China Association for 1848. *Presented by the Association.*

6. A bale of uncleaned cotton from the Naga Hills. *Presented by Major Jenkins.*

Major Jenkins states, that this cotton from the Naga Hills, south of Jorhaut, though inferior to the produce of the Muttock country, which was submitted at the Feb. meeting, is a fair sample of the general produce of those hills.

7. Two specimens of Muttock and Naga cotton, cleaned by his new *churka*, at the request of the Society and Major Jenkins. *Submitted by Mr. J. H. Mather.*

These specimens (clean and unclean) were referred to the Cotton Committee for report.

8. Sample of cotton raised in the public garden, Lucknow, from Dr. Wight's Mexican seed. *Presented by Capt. Hollings.*

Capt. Hollings forwards with this cotton some remarks on the treatment of the plants, by Mr. Purvis, the Head Gardener of the Lucknow Garden.

It was agreed, that this communication and sample be retained for the present till all the returns are received of trials made with the same description of seed in various parts of the country, (of which several have already come to hand), and that the whole be then submitted to the Cotton Committee for comparative report.

9. Two samples of Moulmein grown cotton, one cleaned and the other uncleaned. *Forwarded for the opinion of the Society by Messrs. Eglinton and Co.*

Referred to the Cotton Committee.

10. Two grafts from his fine peach trees, and plants of the conical pineapple from Singapore, and of the small-leafed pine, also from the Straits. *Presented by Dr. K. M. Scott.*

The pines reached in good order, but one of the peach grafts unfortunately perished in transit.

11. A few cuttings of the olive tree from Cairo. *Presented by Dr. Henry Abbott.*

These have arrived in fair condition.

12. A large supply of teak seed, the produce of the Bancoorah plantation. *Presented by Mr. T. B. Mactier.*

These seeds are available to applicants.

The report of the Committee convened to consider the proposed prize for an improved cotton-cleaning machine, unrestricted by any particular mecha-

nical principle; and the suggestion that the Society shall procure drawings and models of agricultural machines, was read. After some little discussion, it was proposed by Baboo Peary Chand Mittra, seconded by Baboo Ram Gopaul Ghose, V. P., and carried :—

"That the report be received with thanks, but the consideration of it be postponed to the next meeting to enable Colonel Sage to submit his minute."

Communications on various subjects.

The following letters were also submitted :—

1. From the Revd. Dr. Duff, tendering his resignation as a member of the Society and of the Committee of Papers, in consequence of his approaching departure from India.

There being already four members on the Committee of Papers, it was not deemed necessary to fill up this vacancy.

2. From Dr. R. Wight, announcing that he has lost no time in meeting the request preferred through the Society, by Mr. J. G. Bruce, of Cawnpore, for a large supply of Mexican cotton seed, the produce of the Coimbatore farms.

3. From Lieut. N. A. Staples, submitting a list of perennial plants of rarer sorts, such as are not included in the Society's annual consignments, and suggesting that a small quantity of seed be procured for sowing during the next cold season in the Society's garden with the view of acclimating the plants for future distribution. Agreed.

4. From T. M. Robinson, Esq., Chota Nagpore, applying for a large supply of acclimated Mexican cotton seed, sufficient to sow about 250 beegahs of land. The Deputy Secretary mentioned, that a request for this seed had been preferred to Dr. Wight on Mr. Robinson's behalf..

(Thursday, the 10th May, 1849.)

William Storm, Esq., Vice-President, in the chair.

Elections.

Major L. H. Smith, Messrs. John Johnson, W. C. Lochner, J. G. Waller, Dr. John Row, Dr. W. H. Bradley, Capt. G. M. Hill, and Capt. C. G. Armstrong.

Proposals.

H. N. Elton, Esq., Civil Asst.-Surgeon, Mymensing,—proposed by the Honorary Secretary, seconded by Dr. Huffnagle;

Dr. Clapperton, Superintending Surgeon, Barrackpore,—proposed by Dr. Strong, seconded by Capt. Jervis;

Andrew T. T. Peterson, Esq., Barrister,—proposed by Mr. J. S. Judge, seconded by Dr. Huffnagle.

Presentations.

1. Southey on Colonial Wools. *Presented by the Author.*

2. Annual Reports of the Commissioner of Patents for the United States of America, for the years 1845-1847, (2 vols.) *Presented by the Commissioner of Patents.*

3. An Essay on the Aborigines of India, by B. H. Hodgson, Esq. *Presented by the Author.*

4. Madras Journal of Literature and Science, No. 34. *Presented by the Madras Literary Society.*

5. Journal of the Asiatic Society of Bengal, for March 1849. *Presented by the Society.*

6. The Journal of the Indian Archipelago, for March 1849. *Presented by the Editor.*

7. Two copies of the same work, for the same period. *Presented by the Government of Bengal.*

8. Specimens of 14 kinds of wood grown on the island of Jamaica. *Presented by William Storm, Esq.*

9. A small supply of cotton seed from Shanghae, the yellow and white kinds; also seed of the tallow tree of China (*Stillingia sebifera*). *Presented by Dr. A. C. Macrae, Officiating Superintendent H. C. Botanic Garden.*

Dr. Macrae states, that these seeds form portion of a despatch received from China through Mr. R. Fortune, of whose letter the following is an extract:—

"I have sent a box (No. 5) which contains a quantity of the Nankin or Shanghae cotton seeds. There are two kinds of these, namely, the white and the yellow, and both are marked with their names. Mr. Mackenzie, an English merchant in Shanghae, who was many years residing in India, informs me, that the Chinese cotton is much superior to the Indian, particularly in color, and that its introduction to India would be a matter of very great importance. Box No. 5 also contains a considerable quantity of the seeds of the tallow tree (*Stillingia sebifera*); the vegetable tallow made from the seeds of this tree is very extensively used in all parts of China, and would probably succeed well in the north-western parts of India." The Secretary intimated, that both sorts of the above mentioned cotton seed had germinated in the Society's garden in seven days from the period of sowing, the yellow kind 75 per cent., but the white only 8 per cent. The seeds of the tallow tree had not yet germinated, though sown on the 27th April.

10. Leaves, seed, root and fibre of the *Chu-ma*, the plant from which the grass-cloth of China is manufactured. *Forwarded from Ningpo, by Dr. Macgowan.*

11. A small assortment of tea seed, of seeds of the cabbage tribe, of the tallow tree, millet of sorts, &c. *Presented by Dr. Macgowan.*

In his communication, advising despatch of the above, Dr. Macgowan states:—"with the specimens of the plant yielding the fibre from which the

grass-cloth is manufactured, I send several other seeds, some of which may prove useful. The tallow tree is, if I mistake not, peculiar to this part of Asia, and, if unknown to India, would prove a valuable acquisition, could it be introduced. A kind of *Brassica* is also enclosed, from which good lamp oil is cheaply manufactured."

The species of *Brassica*, alluded to by Dr. Macgowan, is probably that referred to in "Fortune's Wanderings in China," p. 54, second edition, in the following terms :—

"The oil plant, *Brassica Chinensis*, is in seed and ready to be taken from the ground in the beginning of May. This plant is extensively grown in this part of China, both in the province of Chekiang and also in Kiangsoo, and there is a great demand for the oil which is pressed from its seeds.

"For the information of readers not acquainted with botany, I may state, that this plant is a species of cabbage, producing flower-stems three or four feet high, with yellow flowers, and long pods of seed like all the cabbage tribe. In April, when the fields are in bloom, the whole country seems tinged with gold, and the fragrance which fills the air, particularly after an April shower, is delightful.

12. Sample of an oil seed ("*Sirgooja*") common to the Chota Nagpore district. *Presented by T. M. Robinson, Esq.*

13. A small assortment of vegetable, maize, clover, mangul-wurzel, and cotton seed. *Forwarded by Dr. Royle by the March steamer.*

(All the above-mentioned seeds, are available to members of the Society.)

14. Specimens of the produce of the Tenasserim coast, consisting of the wood and bark of certain trees, a few kinds of seeds, tobacco, rice, &c. *Presented by Mr. H. Fenwick.*

15. Specimens of cotton raised from Dr. Wight's Mexican seed, at Beerbhoom, Benares, Goruckpore, and Banda. *Presented by Messrs. E. Woodcock, C. S.; G. Nicholls; H. C. Tucker, C. S.; and M. P. Edgeworth, C. S.*

These were referred to the Cotton Committee, with specimens previously received, raised in other parts of the country from the same description of seed.

A minute by Colonel Sage, a member of the Committee for Implements of Husbandry and Machinery, dissenting from the report drawn up by his colleagues, and which was submitted at the last month's meeting, regarding the offer of another prize by the Society for an improved cotton-cleaning machine, unrestricted by any particular mechanical principle, was read. After some discussion, it was proposed by Dr. McClelland, seconded by Baboo Ram Gopaul Ghose, and carried,—"that the question of a new prize for a cotton-cleaning machine be referred back to the Committee, with Colonel Sage's minute, for re-consideration."

Notice of Motion.

Col. Sage desired, at this stage of the proceedings, to give the following notice of motion for discussion at the next meeting:—"That neither Presi-

dent, Vice-President, nor the Member of any Committee, be allowed to take part in discussions in which they are interested as competitors for prizes."

Floricultural Exhibition.

A list of prizes, amounting to Rs. 70, which were awarded at the second quarterly flower show, held on the 17th of April, was next submitted, with the accompanying remarks of the judges :—

This show was inferior to that held in April, 1848, both as regards the number of plants exhibited and their general appearance. There were, however, a few well-grown and rare plants, such as *Rondeletias, Hydrangeas, Limonia splendens, Solidago Canadensis,* and *Jacquinia ruscifolia.* The orchids and *Amaryllids* were also well represented, comprising among the former, *Vanda teres* and *Roxburghii, Cymbidum aloifolium, Bletia verecunda,* and *Oncidium luridum;* likewise a few bulbous plants from the Cape.

The produce of sixteen or eighteen gardens was submitted, and prizes awarded to twelve.

The plants were equally as well arranged as at the last show, and the produce of each garden was kept separate, thereby considerably lessening the labor of selecting the prize specimens. With the view, however, of improving the arrangement still further, the judges would recommend that, in future, the prize lists be drawn up with reference to classes, &c., and that the plants be placed accordingly on the show tables.

It having been brought to the notice of the Committee that, though the rule which formerly obtained, viz. that flowers and shrubs, taken from the ground and put into pots for exhibition, could not be entered for competition —has been abolished for a year or more, many persons are nevertheless under the mistaken idea that it is still in force ;—the judges are induced to mention the circumstance in this report, with the view of removing this erroneous impression. They would also suggest, that a note to the effect that this rule has been abolished, be added under the "conditions" of the next prize list.

Report on Chota Nagpore grown Coffee.

A report from Messrs. Willis and Earle on the coffee grown at the Government plantation at Kishenpore, Chota Nagpore, was next read.

The best thanks of the Society were given to Messrs. Willis and Earle for their report, which was referred to the Committee of Papers.

Communications on various subjects.

The following letters were also submitted :—

1. From Dr. Robert Wight, Supt. Govt. Cotton Farms, Coimbatore, submitting a second communication regarding the cultivation of Mexican cotton in India.

2. From Mr. H. Fenwick, offering some remarks respecting the agricultural resources of the Tenasserim Provinces. Referred to the Committee of Papers.

3. From R. Burn, Esq., Edinburgh, on the subject of his cotton-cleaning machine.

4. From Dr. Macgowan, forwarding the specimens alluded to among the presentations, and offering a few remarks thereon. Referred to the Committee of Papers.

Letters were also read from E. E. Woodcock, Esq., at Beerbhoom; H. C. Tucker, Esq., at Gorruckpore; G. Nicholl, Esq., at Benares; M. P. Edgeworth, Esq., Banda; J. O. Price, Esq., Dacca; and H. H. Bell, Esq, at Agra; reporting the result of their trials with the Mexican cotton seed, forwarded last year to the Society by Dr. Wight.

(Thursday, the 14th June, 1849.)

William Storm, Esq., Vice-President, in the chair.

Elections.

Dr. H. N. Elton, Dr. Clapperton, and A. T. T. Peterson, Esq.

Proposals.

Benjamin Warwick, Esq., Calcutta,—proposed by Mr. H. Mornay, seconded by Mr. R. F. Ross;

J. R. Grey, Esq., Merchant, Calcutta,—proposed by Mr. Alfred Turner, seconded by the Honorary Secretary;

The Hon'ble J. C. Erskine, Civil Service, Simla,—proposed by the Honorary Secretary, seconded by Dr. Huffnagle;

Eneas Mackintosh, Esq., Purneah,—proposed by Mr. W. Storm, seconded by Mr. W. G. Rose;

Captain J. R. Western, Engineers, Jullundur,—proposed by Capt. W. Abercrombie, seconded by the Honorary Secretary.

Presentations to Library.

1. Memoir of the Statistics of the N. W. Provinces of the Bengal Presidency. *Presented by the Government of the N. W. Provinces.*

2. Journal of the Indian Archipelago for April and May. *Presented by the Editor.*

3. Two copies of the same work, for the same period. *Presented by the Government of Bengal.*

4. Journal of the Asiatic Society of Bengal for April. *Presented by the Society.*

5. Report of the Commission appointed by the Governor of Mauritius to enquire into the causes of the disease that had appeared among the sugar-canes, and the means of remedy. *Presented by the Mauritius Government.*

Garden and Museum.

1. Seven and half maunds of New Orleans cotton seed, and twelve seers of Sea-Island cotton seed, the produce of the Coimbatore farms. *Presented by Dr. R. Wight.*

(This seed is in the course of distribution.)

2. Seeds of Nankin cotton, mummy wheat, Kassilar melon, and a species of African gourd. *Presented by Major Charlton.*

The Secretary intimated, that a portion of these seeds, sown in the Society's garden, had germinated freely: and so had several of the Chinese seeds presented by Dr. Macgowan at the last meeting.

3. Four plants of Seville orange (which have arrived in good condition), some seed of the same and of two kinds of citron, which attain an immense size in his garden at Gowhatti. *Presented by Dr. K. M. Scott.*

Dr. Scott likewise forwards a *Sapota,* which he has been induced to send from the frequency of the remarks made regarding the unusual size of this fruit in his garden. "This one"—Dr. Scott adds—"weighs nearly 17 tolas, but I have had several between 18 and 19 tolas in weight. I got the original plant from Dr. Wallich about 9 years ago, and have now several trees bearing luxuriantly."

4. A quantity of seed of the Chinese tallow tree, and of the "Al" *(Morinda citrifolia). Presented by Colonel J. R. Ouseley.*

Colonel Ouseley mentions, that the first named seed is produced from trees in his garden, which were sent to him by Mr. Griffith, five or six years ago; they are now about 12 feet high. Colonel Ouseley states that the tree thrives exceedingly well in Chota Nagpore, and cuttings take most rapidly; he has now 50 or 60 large trees. In regard to the cultivation of the "*Al,*" Colonel Ouseley gives the following directions:—

"The ground is prepared by being dug rather deeply, and the seed sowed broad-cast, and rather thickly: it is dug the third year, being left to itself for that period; no weeding or irrigation are required. Above ground it has an appearance like "*Oorid,*" *(Phaseolus Max)* when ready for digging. The roots only are used; for dyeing "*kharwah*" and other cloths of a dark damask red, it is valuable and a fixed color; the cloth dyed with it is used for the linings of tents, coverings of palankeens, &c., and much liked by water-carriers. The seed is sown at the commencement of the rains. I have never seen the plant, but in Central India."

Colonel Ouseley mentions, in the same communication, that the English walnut trees in his garden are fruiting this year, and the Cabool walnut, of which he has 180 trees, thriving capitally. The English raspberry also has produced a considerable quantity of fruit this year.

5. A specimen of bean from the Shan country, "the largest species of bean known, except the butter." *Presented by Mr. H. Fenwick.*

6. Sample of cotton raised in the Bhauglepore Branch Society's garden from Dr. Wight's Mexican seed. *Presented by Major Napleton.*

7. Samples of cotton raised from the same description of cotton in his garden at Allahabad, and in an adjoining village. *Presented by R. Lowther, Esq.*

(Referred to the Cotton Committee.)

8. A quantity of the cochineal insect in a dried state, from Deenanuggur, in the Jullundur Doab, and a specimen of yarn dyed with it. *Presented by Capt. F. C. Burnett.*

Captain Burnett, in a communication read at the March meeting, states that the insect is indigenous to that part of India, and is picked from the common *Cactus*, of which there are immense hedges, but in consequence of a sudden influx of the cochineal they have been generally destroyed this year.

In connection with the above, Dr. McClelland stated that, about two years since, he perused an interesting letter from Dr. Dempster, describing a cochineal insect from which he extracted very fine scarlet colors, samples of which, on various kinds of cloth, accompanied his letter. The insect was said by Dr. Dempster to be most abundant on some sort of *Cactus* growing in Kemaon. He (Dr. McClelland) believed he proposed in reply that the plant upon which the South American insect feeds *(Opuntia cochinelifer)*, and which is abundant about Calcutta, should be sent up to Dr. Dempster, in order to ascertain how far it might improve the quality of his cochineal. Since then he had been favored with the perusal of further papers from Dr. Dempster on the subject, in which mention was made that Dr. Fleming, then employed in a scientific mission, had found the cochineal insect to be very abundant in the northern parts of the Punjab, that it might be collected in large quantities, and in fact that it is, and has been, collected and sold as an article of trade, and that the dyers of Umritsir are well acquainted with its valuable properties. Dr. McClelland added, that it might be in the recollection of some of the members present, how unsuccessful had been the strenuous endeavours of the Society, some ten years ago, to introduce the *Grana fina*, or real cochineal insect, from Bourbon, and he was of opinion, that in this, as in other things, failures will ensue where a reliance is placed on the successful introduction of foreign species, while much success is to be hoped for from steady and well directed attempts to improve the native sources of production, as in the case of Dr. Dempster's cochineal.

The Secretary remarked, in reference to Dr. McClelland's observations, that he believed the papers and specimens alluded to were at present with Dr. Falconer for report to Government; and as Captain Burnett had expressed a wish for an opinion on the specimens sent down by him, he would suggest their transfer to Dr. Falconer. Agreed, and that Dr. Falconer be

requested to favor the Society with his opinion on them, in comparison with those submitted by Dr. Dempster.

9. Specimens of iron-ore from the south bank of the Damooda. *Presented by T. B. Mactier, Esq.*

Mr. Mactier remarks,—" I am aware that information regarding mineral productions is not within the sphere of the Society's operations, I have however been induced to send these specimens in the hope, that thereby attention may be called to the mineral wealth of the south bank of the Damooda. As the institution of railways will no doubt soon make good iron in extensive demand, the knowledge that iron-ore is to be found within reach of the collieries on the north bank of the Damooda, and that lime in the shape of " Goutines" is also procurable, may eventually be useful. I cannot give you from personal enquiry the exact localities: my informants, in this instance, are natives, who tell me large quantities of ore are to be found close to the surface in the thannahs of Sitta and Rugunatpore: the specimens now sent are part of a quantity I got for fabrication into fetters for the prisoners in the zillah jail."

It was agreed, that these specimens, with a copy of Mr. Mactier's letter, should be transferred to the Asiatic Society for deposit in its Museum of Economic Geology.

A few fine clusters of the black Hamburg grape, raised in the Metcalfe Hall compound, from cuttings received from Dr. Huffnagle (who obtained them from the Cape), and planted in September 1846, were also placed on the table.

The motion of which notice was given by Colonel Sage at the last meeting, " That neither President, Vice-Presidents, nor the Members of any Committee, be allowed to take part in discussions in which they are interested as competitors for prizes," was brought forward. Previous to supporting the motion Colonel Sage desired to withdraw from it the word " President," which he stated had been inadvertently introduced, and to insert the word " Honorary Secretary." The proposition was then made, seconded by Dr. McClelland, discussed at some length, and eventually withdrawn by the proposer, in favor of the following motion, of which notice for the next meeting was given by Mr. W. G. Rose, seconded by Colonel Sage,—" that a Committee of Members be appointed to revise the existing regulations for the government of the Society, and to add such as they may think necessary, the whole to be submitted for the approval of a general meeting of the Society."

Horticultural Exhibition.

A list of prizes awarded to native gardeners at the second quarterly show of vegetables and fruits, held on the 23rd May, was next submitted, with the following remarks :—

"The collection was fully equal, if not greater, than that of the second quarterly show of last year. There was a tolerably fair assortment of cabbages of sorts (the sugar-loaf, drumhead, Brussels sprouts, &c.), as also of turnips, carrots and asparagus; the latter much better grown than the specimens submitted in May 1848. The celery was not sufficiently good for a prize, and the beet-root was indifferent. The collection of herbs, such as mint, peppermint, thyme, marjoram, &c., was more varied than usual.

The only specimens in the department of native vegetables worthy of notice, were some exceedingly well grown ears of maize, raised from Patna and American seeds.

Among the fruits the mangoes, peaches, litchees, and grapes were well represented; there were also a few baskets of good melons of sorts, and of sapotas, soursops, pomegranates, and pine-apples.

Mr. Speede (a member of the Fruit and Kitchen Garden Committee) and the Deputy Secretary, selected the prize specimens. The amount awarded, namely, Rs. 110, was distributed by W. Storm, Esq. V. P.

Report on samples of Cotton from Assam and Moulmein.

A report by Messrs. Huffnagle and Earle on certain musters of cotton from Major Jenkins and Messrs. Eglinton and Co., which were laid before the last meeting, was next read and transferred to the Committee of Papers for publication.

Cotton-cleaning Machines.

The Secretary next desired to bring to the notice of the meeting, the following extract of a letter from Mr. Hamilton Bell, of Agra, on the subject of improving the present mode of divesting cotton of its seed :—

"At the desire of Government I have put up Mr. Mather's *churkas* to try them with bullock power, but have not yet succeeded in reaching the maximum of his Calcutta trials. Several others have been submitted for trial, and one which evinced a good deal of ingenuity from the adaptation to it of a self-feeding apparatus. This is the invention of a native, and has considerable merit, although I am in great doubt if it will be practically of much advantage, as it will require a nicety of construction and firmness of adjustment not easily to be managed, in this country, by native workmen. It is the only thing which shews any invention; all the rest are only more neatly constructed *churkas*. I am almost inclined to imagine, that the more closely we adhere to the despised native machine, the more likely are we to reach our object. Just now my opinion is, that all we should do is to give firmer standards and lengthen the wooden roller to admit of the substitution of a wheel and band for the winch by which the rollers are kept in motion. By this means the feeder's hands are both disengaged, he has no laborious exertion to make, and a far greater celerity of motion may be obtained. I caused this to be roughly tried by sharpening one end of a

spindle and driving this into the broad end of the wooden roller; of course it stood only for a short time, but it did its work in a manner that surprised me, turning out at the rate of nearly 4 lbs. clean cotton *per hour*. It is clear to me this is not its limit; for we had evidently not reached the maximum of efficient celerity, and the feeder will improve by practice in supplying the cotton with both hands. I shall pursue this idea, and will communicate the result. My conjecture is, that by applying the same system of gearing as that employed with Mr. Mather's eleven machines, but of much lighter construction, one man will suffice for turning a dozen of these *churkas*; nor do I much doubt that each will turn out nearly 50 lbs. per diem; for I see no reason why the rate of movement of the rollers should not be greatly increased."

Communications on various subjects.

The following communications were also laid before the meeting:—

1. From J. Thornton, Esq., Secretary to the Government of the N. W. Provinces, submitting a communication from the Commissioner of the Agra Division, descriptive of a mode adopted in some villages of Pergunna Pinnahut, zilla Agra, of cultivating sugar-cane without irrigation.

2. From R. Lowther, Esq., giving some further particulars regarding the virtues of *Aristolochia Indica* as an antidote to snake-bites.

3. From Major Napleton, Honorary Secretary, Branch A. and H. Society, Bhauglepore, forwarding an account of an exhibition of vegetables, flowers and agricultural produce held on 31st May.

4. From Major Charlton, dated Almorah, 18th May, on the subject of tea cultivation in that province.

5. From T. M. Robinson, Esq., regarding coffee plants in Chota Nagpore.

The above five communications were referred to the Committee of Papers.

6. From M. P. Edgeworth, Esq., Commissioner of Mooltan, seeking information regarding the mode adopted in Bengal for manufacturing sugar from the date tree. Mr. Edgeworth states, that "the date grows in great profusion in Mooltan, the female tree bears excellent fruit, which is a large source of revenue, while the male tree is used to give the *toddy* only near large towns, and in the villages is considered worthless. Did the people know the mode of extracting the sugar, there would be a very large increase to the resources of the district, and I am most anxious to introduce it among them."

Mr. Edgeworth applies for seed of the Mexican cotton, and also of the *Carob* tree, for introduction in Mooltan. "We have," he adds "a rich sandy loam for a soil, and a profusion of irrigation, as different conditions as possible from my late district of Banda; and the time and manner of sowing is also different, as there are no periodical rains here: cotton was begun to be sown about a fortnight ago, but I doubt not, if you can favor me with a small

portion of the seed now, I might get enough for sowing experimentally next year. I shall further be much obliged for any such seeds as you may think worthy of introduction, as we have a soil and climate capable, I believe, of producing any thing."

The Secretary intimated, that no time had been lost in sending Mr. Edgeworth a small supply of the cotton seed lately received from Dr. Wight, and in furnishing him with the required information regarding the preparation of sugar from the date palm. His name, as also several others, had been registered for *Carob* seed on receipt of another supply now daily expected.

7. From Major Spottiswoode, 1st Assistant Studs, N. W. Provinces, dated Haupur, June 4th, applying for a quantity of *Carob* seed. Major Spottiswoode remarks—" from the accounts given in the annual report of the Society, published in the 6th volume of its Journal, I am inclined to think the *Carob* would thrive here, and eventually prove a great blessing to this part of the world. Our seasons have been very irregular ever since that dreadful one of 1837-38 ; crops have generally been indifferent, and forage each year for grazing cattle more scanty. I state this from personal experience, having resided here nearly 13 years, and the nature of my work brings me in constant contact with all the farmers for 8 or 10 miles round."

8. From Mrs. Gardiner and Miss Davy, stating that they have raised at Serampore a number of plants of Bourbon cotton, which they are prepared to dispose of at ten rupees each.

9. From J. Sutherland, Esq., applying for a supply of seeds for the public garden at Azimghur.

10. From G. F. Smith, Esq., the same request for the use of the public garden at Mynpooree.

11. From Messrs. Villet and Son, advising the despatch by the *Geelong*, of the Society's consignment of vegetable seeds from the Cape.

12. From Messrs. Bullard and Lee, of Boston, advising the despatch per *Tartar*, of the Society's consignment of vegetable and flower seeds ordered from Mr. Landreth of Philadelphia.

(Thursday, the 12th July, 1849.*)*

William Storm, Esq., Vice-President, in the chair.

Elections.

Messrs. Benjamin Warwick, J. R. Grey, Eneas Mackintosh, the Hon'ble J. C. Erskine, and Capt. J. R. Western.

Proposals.

R. M. Thomas, Esq., Solicitor, Calcutta,—proposed by Dr. Huffnagle, seconded by the Honorary Secretary ;

Nihal Sing, Sirdar of Kupoorthullah, Jullundur Doab,—proposed by Capt. F. C. Burnett, seconded by Mr. Hercules Scott;

Lieut. James Williamson, 49th Regt. N. I.,—proposed by Capt. G. C. Armstrong, seconded by the Honorary Secretary;

Francis Tucker, Esq., Civil Service, Dorunda,—proposed by Capt. Armstrong, seconded by the Honorary Secretary.

Presentations.

1. A quantity of seed of *Ipomœa rubro-cœrulea.* *Presented by C. D. Russell, Esq.*

2. Specimen (No. 3) of cotton raised in the Branch Society's garden at Bhauglepore, from Dr. Wight's Mexican seed. *Presented by Major Napleton.*

3. A supply of "*Ishurmool*" seed (*Aristolochia Indica*). *Presented by R. Lowther, Esq.*

4. A second specimen of cotton raised at Allahabad, from Dr. Wight's Mexican seed. *Presented by R. Lowther, Esq.*

Mr. Lowther mentions, that this cotton was plucked on the 15th June, from the same plants from which his first specimen was gathered. The seed was sown in July of last year.

"The Mexican cotton plant"—observes Mr. Lowther—" will stand any heat provided it is properly irrigated. The temperature has been unusually high this year: an *Aloo-Bokhara* tree in full bearing, near the cotton plants, was destroyed, and the leaves of some *Loquat* trees and plantains scorched, the former a deep red, whereas the cotton plants under the same temperature were strong and healthy, and, strange to say, threw out a third crop of blossom, which, however, was destroyed a few days ago by a heavy fall of rain; but others have burst forth, and second pods are coming forward."

The motion of which notice was given at the last meeting by Mr. W. G. Rose, seconded by Col. Sage—" that a Committee of Members be appointed to revise the existing regulations for the government of the Society, and to add such as they may think necessary, the whole to be submitted for the approval of a general meeting of the Society"—was brought forward and carried. It was further agreed, that the following gentlemen form the Committee :—

Col. Sage, Dr. McClelland, Dr. Falconer, Baboo Ramgopaul Ghose, Dr. Huffnagle, Mr. W. Storm, Mr. M. S. Staunton, and Mr. W. G. Rose.

The revised report of the Committee convened to consider the proposed prize for an improved cotton-cleaning machine, unrestricted by any particular mechanical principle, was next read, when it was proposed by Baboo Ramgopaul Ghose, seconded by Mr. Rose, and carried—

"That the report be received, and the thanks of the Society given to the Committee, but that its consideration be deferred to the next general meeting; the report being intermediately printed and circulated for the information of resident members."

Read a letter from Baboo Pearychand Mittra, Librarian of the Public Library, conveying a proposition from the Curators of the Library, for the appointment of a "Joint House Committee" for the Metcalfe Hall.

Agreed, and that Messrs. W. G. Rose and J. H. Mather represent the Society.

Communications on various subjects.

The following letters were also submitted :—

1. From Dr. Falconer, reporting on the specimen of Jullundur cochineal, presented by Capt. F. C. Burnett, at a former meeting. Referred to the Committee of Papers.

2. From Lieut. John Eliot, Artillery, Cawnpore, giving a very favorable account of the result of his sowing, of the vegetable and flower seeds received last year from the Society. Mr. Eliot also gives the plan adopted by him for raising strawberries at that station.

3. From Capt. F. C. Burnett, Artillery, dated at Deenanuggur, 8th June, proposing Nihal Sing, Sirdar of Kupoorthullah, as a member of the Society. Capt. Burnett remarks,—"the Sirdar is a large landed proprietor in the Jullundur Doab, about sixteen miles from the station, and is anxious to improve the country in every way: he has a very extensive garden, and will be glad for seed of all sorts. I am still encamped in this place, the thermometer at 105° in my tent. There are some very good fruit gardens here, several sorts of plums, plenty of quinces: the toon tree flourishes here, and the *Platanus orientalis* has been introduced from Cashmere. The vines ascend to the top of the highest trees, and are now covered with grapes; the trees are loaded with mangoes, immense branches break off from their weight, and renders our position under the trees dangerous. The *Mooshkbed*, or musk willow, grows abundantly here."

4. From J. A. Craigie, Esq., Magistrate of Saharunpore, forwarding a small quantity of seed, which is reported by the Darogah of Gungoh, in that district, to have fallen from the clouds in certain parts of Gungoh, and in villages contiguous thereto. Mr. Craigie suggests, that they may have been caught up in a storm and dropped on its subsiding—"but the curious thing"—he observes—"is, that no one knows what seeds they are!"

The Secretary mentioned, that having referred the seed in question to Dr. Falconer, he had been favored with the following particulars from that gentleman :—

"The seed, although at first sight resembling a grain somewhat in appearance, has nothing to do with any of the *cerealia*, it is derived from a

species of *Casearia*, of which there are three in the Dhoon and Tarai forests, at no great distance from Gungoh. One species called "*Cheela*," attains the size of a large tree. It is very common in the forests, and probably there may be some trees of it in the vicinity of Gungoh. The seed presents positive characters which render the determination of the genus (*Casearia*) certain: but the materials sent are too incomplete for the ascertainment of the exact species, as they consist of bare seeds without the capsule. It will probably turn out to be from the "*Cheela*." The seed had probably been taken up in a strong wind, as conjectured by Mr. Craigie, and dropped at, or blown to, Gungoh and the neighbouring villages. The spurious resemblance which it bears to a *cereal grain* gave it an interest which would not have attached, probably, to any other seed falling under the same circumstances. Hence to the easy belief of the native, it looked like a new kind of "*Naj*," rained from heaven. It does not appear, however, from Mr. Craigie's note or the depositions, that it fell in any quantity, but on the contrary, very sparingly."

5. From M. E. Daniel, Esq., Assistant Secretary, E. I. Railway Company, asking for a copy of Mr. Mactier's communication to the Society, which was submitted at the last meeting, regarding the presence of iron-ore on the south bank of the Damooda.

Agreed, that the information be given.

6. From Mr. Wheeler, Hazareebaugh, giving an account of his success in growing coffee at that station from seed supplied to him by Col. Ouseley. Mr. Wheeler states, that in a nursery of half a biggah of ground he has raised from fourteen to sixteen thousand plants, many of them fit for transplanting; and that he is negotiating for the lease of 50 biggahs of land for the purpose of forming a plantation.

(*Thursday, the 9th August,* 1849.)

Dr. Charles Huffnagle, Vice-President, in the chair.

Elections.

Lieut. James Williamson, Messrs. R. M. Thomas, Francis Tucker, and Sirdar Nihal Sing.

Proposals.

Baboo Gungapersaud Gossain, Serampore,—proposed by Mr. Wm. Storm, seconded by Mr. W. G. Rose;

Major A. C. Spottiswoode, 37th N. I., Stud Department, Haupur,—proposed by Major R. Houghton, seconded by the Honorary Secretary;

Lieut. A. Fytche, 70th N. I., Assistant Commissioner of Arracan,—proposed by Dr. Huffnagle, seconded by Mr. R. W. Frith;

Dr. Bannatyne W. Macleod, Suptdg. Surgeon, Agra,—proposed by Mr. C. S. Stowell, seconded by the Honorary Secretary;

George Campbell, Esq., Deputy Commissioner, Loodianah,—proposed by Mr. Hercules Scott, seconded by Capt. F. C. Burnett;

The Hon'ble Sir J. W. Colvile,—proposed by the Honorary Secretary, seconded by Dr. Huffnaglo;

Edward Smith, Esq., Merchant, Calcutta,—proposed by Mr. J. H. Mather, seconded by the Honorary Secretary.

Presentations to Library and Garden.

1. Transactions of the Royal Society of Arts and Sciences of Mauritius, vol. 1, part 2. *Presented by the Society.*

2. A descriptive account of the fresh-water sponges in the island of Bombay.* By H. J. Carter, Esq. *Presented by the Author.*

3. Journal of the Asiatic Society of Bengal, for May 1849. *Presented by the Society.*

4. A few date seeds of sorts, and seed of the *Doom* palm of Egypt (*Hyphœnea coriacea,* Sprengel). *Presented by Dr. H. Abbott of Cairo.*

5. A large assortment of seeds of the Forest trees of North America. *Presented by Mr. David Landreth of Philadelphia.*

The revised report of the Committee convened to consider the proposed prize for an improved cotton-cleaning machine, unrestricted by any mechanical principle, which was received at the last general meeting, but the consideration of it deferred to the present, was again brought forward. The Secretary intimated that, in accordance with the resolution of the last meeting, the report had been printed and circulated to all the resident members.

Proposed by Dr. Mouat, seconded by Baboo Pearychand Mittra, and resolved unanimously, that the report be adopted.

A report of the proceedings of a preliminary Meeting of the House Committee of the Metcalfe Hall was next submitted, and agreed to.

Communications on various subjects.

The following communications were also read:—

1. From Dr. A. Campbell, Superintendent of Darjeeling, applying for the second annual grant of Rs. 100 for prizes to be distributed at the Titalya fair in January next. Dr. Campbell also states, that his attempt to cultivate the tea plant at Darjeeling, of which he gave a detailed account in 1847, has proved a failure.

2. From D. F. McLeod, Esq., Deputy Commissioner in the Punjab, dated Dharmsala, near Kangra, 21st July, of which the following is an extract:—

"This being a hill station, very similar in climate and characteristics to Massuri,—save that we have the snowy range within an afternoon's walk

f

of us,—I fancy I can hardly render the Society any services in this quarter, which cannot be more effectively rendered by your other correspondents at that place, Almorah or Simlah. If, however, I can at any time do so, I trust you will not fail to command them.

"Captain Hay, recently appointed the Assistant in Kûllû, has lately proceeded across the snowy range into Lahoul,—which is included within the Kangra district—and where he had falls of snow almost daily after his arrival there last month! He had sent us a wild *yellow* rose, which he states grows there in abundance, the leaves scented like the sweet-briar, and has promised to bring away with him some plants on his return to Kûllû. He mentions also, that the European gooseberry grows there with great luxuriance.

"Pray kindly send us all and any seeds you can spare, as I am about to commence upon the first garden ever established here, and they will be a great acquisition. Maize or Indian corn is a staple article of culture up in these hills, so that any varieties you can send us would be turned to good account."

3. From Captain F. C. Burnett, dated from Boodie Pind, in the Jullundur Dooab, 9th July, stating that the large supply of fine teak seed sent to him by the Society, some time ago, has failed to reach him, much to his disappointment, as the teak thrives wonderfully well in the Dooab, Captain Burnett adds: "the whole country around this small station is most rich and highly cultivated, and this, without the aid of irrigation; as I rode through the country after a shower the fields were covered with thousands of ploughs at work; this promises to be a most favorable year for agriculture. I preserved some apricots and peaches at Deenanuggur finer than any I had ever seen. When I left Deenanuggur the country around was like Bengal, one sheet of water, it is so low."

4. From W. Ainslie, Esq., announcing the dissolution of the Cuttack Branch Society, and returning two silver medals sent last year by the Parent Society.

5. From Mr. David Landreth, Philadelphia, enclosing an invoice of the Society's annual consignment of vegetable, flower, maize and cotton seed, shipped per *Tartar*.

6. From the same, announcing the despatch per *Delhi*, which left Boston at the close of May, of another consignment consisting of 100 parcels of vegetable seeds.

These seeds having been sent under a misinterpretation of the order given to Mr. Landreth, it was agreed they should be advertised for sale on arrival.

7. From Messrs. Villet and Son of the Cape of Good Hope, advising the despatch per *Hartley*, of the remainder of the annual supply of vegetable seeds, consisting principally of peas and beans, which they were unable to include in the consignment received in June last.

A memorandum of the germination of these seeds at the Society's garden was likewise placed on the table. The average results as regards the supply obtained from the United States are very favorable. Of those received from the Cape two-thirds have sprouted readily, four kinds indifferently, while three kinds (leek, spinnage and lettuce) have altogether failed.

(Thursday, the 13*th September,* 1849.*)*

Dr. Charles Huffnagle, Vice-President, in the chair.

Elections.

Baboo Gungapersaud Gossain, Major A. C. Spottiswoode, Lieut. A. Fytche, Dr. B. W. Macleod, Sir J. W. Colvile, Messrs. Geo. Campbell, C. S., and Edward Smith.

Proposals.

G. R. Barry, Esq., Deputy Magistrate, Serajgunge,—proposed by Mr. R. T. Larmour, seconded by Mr. J. J. Gray;

A. C. Plowden, Esq., Civil Service, Bolundshuhur,—proposed by Mr. Thomas Tonnochy, seconded by the Honorary Secretary;

John Johnstone, Esq., Merchant, Calcutta,—proposed by Mr. S. P. Griffiths, seconded by Mr. John Johnson;

Baboo Maudhub Chunder Mullick, Calcutta,—proposed by Baboo Peary Chand Mittra, seconded by Baboo Ram Gopaul Ghose;

Lieut. F. W. Ripley, Offg. Asst. Commissioner of Arracan,—proposed by the Honorary Secretary, seconded by Dr. Huffnagle.

Communications on various subjects.

Read the following letters:—

1. From W. Seton Karr, Esq., Under-Secretary to Government of Bengal, stating the intention of His Honor the Deputy Governor to transfer to the Society a cottage saw-gin, on receipt of a batch which has been shipped for Bengal by the Honorable the Court of Directors.

2. From Capt. C. W. Scott, Secretary Military Board, requests the instructions of the Society regarding the disposal of a cotton-cleaning machine left at the arsenal in 1842 by the late Dr. Spry.

Resolved,—That the machine in question be returned to the Society.

3. From H. Hamilton Bell, Esq., Agra, promising to meet the request of the Society for a model of the *churka* of that district. Mr. Bell also gives replies to certain queries respecting the cost of divesting cotton of its seed by means of the *churka*, the quantity turned out in a given time, proportion of seed to cotton, &c.

In reply to an enquiry from Col. Sage, Dr. Huffnagle kindly offered to procure a Chinese cotton-cleaning machine, to place with others in the Society's model-room.

4. From R. Montgomery, Esq., Deputy Commissioner in the Punjab, requesting to be furnished with a large assortment of garden, flower, and other seeds for distribution throughout the districts in his division. "There are five districts in my division," observes Mr. Montgomery, "Lahore, Wuzeerabad, Deenanuggur, Amritsur, and Shaiklopoul, and I have the means of at once disseminating them through about one-fourth of the Punjab. This is the land of gardens, and there is no town or city of any size that has not several. Lahore, Amritsur and Deenanuggur abounds with them, but they have none of our English seeds, nor am I aware that they have any English vegetables. There never was a country better adapted for gardens. The soil is very light and most luxuriant wherever water can be brought upon it."

The Secretary mentioned, that a quantity of seeds of sorts, including some of the fine kind of American maize lately received by the Society, had been forwarded to Mr. Montgomery.

5. From W. Seton Karr, Esq., Under-Secretary to Government of Bengal, requesting that one maund of the coffee received from the Government plantation at Kishenpore, Chota Nagpore, be transferred to the Superintendent of Marine for shipment to the Court of Directors; and placing the remainder, (about two maunds) by desire of the Deputy Governor, at the disposal of the Society.

The best thanks of the Society were tendered to the Deputy Governor. It was also directed, that small quantities of the coffee be given to all members applying for it.

6. From John Mayer, Esq., of the Madras Medical Establishment, requesting the aid of the Society in obtaining specimens of soils from the Dacca district, in which the cotton plant is grown, with a few of the plants also. Dr. Mayer states, that his object in preferring this request is to enable him to meet Professor Royle's wish for analyses of these soils and plants.

Resolved,—That a copy of Dr. Mayer's letter be forwarded to Mr. Price, in charge of the Government cotton farms at Dacca, and his attention solicited to the contents.

7. From Mr. C. Wheeler, Hazareebaugh, presenting a few Peshawur melon seeds. Mr. Wheeler mentions that this melon is a fine large species, giving a fruit of grateful taste. Mr. Wheeler likewise offers the following remarks regarding his coffee plantation at Hazareebaugh :—

"I have under difficulties (pecuniary principally) of no ordinary character, and by dint of great labor and perseverance, raised a nursery of 20,000 plants, about 300 of which were sown in 1846. I fully expect they will bear fruit next year, when I shall have the honor of transmitting a sample

to your address. I fear I shall find much difficulty in finding funds to form and keep up a plantation of even the number of plants I have already reared until they become profitable, unless I can obtain one or two partners ; and to increase my cultivation, as I wish to do, according to my advertisement in the *Picnic Magazine,* I am entirely dependent upon the chance of obtaining shareholders. I know the coffee grown at Hazareebaugh to be a marketable article, having in 1848 sent a sample (very badly cured and got up) to a firm in Calcutta, for which I was offered at the rate of 10 Rs. per md. My calculations have been based upon this low scale, and I feel confident, nay certain, that a cultivation of a lac of plants would be a safe and profitable concern. The trees here give a large yearly increase, so much, that there are three trees, one in Dr. Collum's, and two in the gardens of the ex-Ameers of Scinde, which are about 12 or 14 years of age, and have yielded yearly, for the last 3 years, very little less than one maund of uncleaned berries. I mention this particularly, as in a communication I received from a Mr. Morrison, who appears to have been a coffee planter in Ceylon, he says the trees only last in bearing for about 3 or 4 years after bearing, and never yield more than they do the second bearing."

7. From Dr. Wallich, dated London, 5th July, introducing to the notice of the Society, Mr. Booth, a nurseryman, who is about proceeding to India, with the view of collecting specimens, preserved and living, as well as fruits and seeds, of plants in the Himalayan ranges.

(Thursday, the 11th October, 1849.)

William Storm, Esq., Vice-President, in the chair.

Elections.

Messrs. G. R. Barry, A. C. Plowden, John Johnstone, Baboo Maudhub Chunder Mullick, and Lieut. F W. Ripley.

Proposals.

John Halliday, Esq., Akyab,—proposed by Mr. W. Storm, seconded by Mr. W. G. Rose ;

John Lyall, Esq., Merchant,—proposed by Dr. Huffnagle, seconded by Mr. S. P. Griffiths.

Presentations to Library.

1. Transactions of the Agricultural Societies of Massachusetts, (United States) for 1845-47, and a few other pamphlets on manures, &c. *Presented by B. Guild, Esq., Secretary of the Massachusetts' Society for promoting Agriculture.*

2. Journal of the Indian Archipelago for July and August, 1849. *Presented by the Editor.*

3. Two copies of the same work, for the same period. *Presented by the Government of Bengal.*

4. Journal of the Asiatic Society of Bengal, for June and July, 1849. *Presented by the Society.*

Garden and Museum.

1. Thirty seers of "*Sirgoojah*" oil seed. (*Verbesina sativa,* Roxb.) *Presented by Messrs. Willis and Earle, on behalf of Mr. Jeffry Finch, of Tirhoot.*

This seed, known by the name of "Niger," in the English market, is the produce of some plants grown at Mr. Finch's factories, at Shahpore Oondee. A specimen of the same description of seed from Chota Nagpore was also presented by Mr. T. M. Robinson, at the general meeting in May last.

2. Model of a common *churka,* value one anna and a half, from Gowalparah, Assam. *Presented by Major Jenkins, on behalf of Mr. J. Bedford.*

Some very well grown cut specimens of Dahlias, of 10 or 12 varieties, from Mr. Emin's garden at Garden Reach, were also placed on the table.

Offer of a prize of 5,000 Rupees by Government for an efficient Cotton-cleaning Machine.

Read the following letter from the Under-Secretary to Government of India, to the Under-Secretary to Government of Bengal, enclosed in a communication to the address of the Honorary Secretary, Agricultural and Horticultural Society, on the above mentioned subject. (This letter will be found in the leading department, page 39.)

Resolved,—That the best thanks of the Society be tendered to the Government for the offer of this handsome reward, and that the letter be referred to the Machinery Committee, to arrange the form of advertisement, and other necessary details connected therewith.

Communications on various subjects.

The following letters were also submitted:—

1. From R. N. C. Hamilton, Esq., resident at Indore, submitting replies received from officers in charge of different parts of the Province of Malwa and Nimar, to several queries of the Society on the subject of cotton.

2. From Major Jenkins, submitting replies on the same subject from Mr. Bedford, Sub-Assistant Commissioner of Assam, at Gowalparah, and forwarding a *churka* in common use in that district.

3. From Major Napleton, Honorary Secretary, Branch Agricultural and Horticultural Society, Bhauglepore, applying for the usual annual donation of two silver medals, and fifty rupees. Major Napleton also announces his approaching departure from Bhauglepore, and solicits additional aid from the Parent Society on behalf of that Branch Institution:—

"I must now tell you that I am much puzzled as to how I am to find a person to relieve me from the laborious duties of Honorary Secretary, and whether there will be a sufficient number of subscribers to support the institution, as it is now kept up, after I leave, is another source of much anxiety to me. I can scarcely believe the Parent Society would consent to the breaking up of one of the finest Botanical Gardens in India for want of their support.

"Would it be too much to expect, were we to entertain a hope of the Parent Society being good enough to send up a practical Superintendent to take charge of the Garden and conduct the duties of it, or would it allow a sum of money monthly to assist in paying the establishment? This, perhaps, would be the most solid grant; as the Parent Society is rich, the money would be well bestowed in such a cause."

Resolved,—That the Society will willingly continue its present assistance, and on every special application do its best to meet the wishes of the Branch Society, but that it cannot establish the precedent of paying for a Superintendent of a Branch Garden, or any portion of its establishment, the same being essentially the obligations of resident members.

4. From Mr. G. T. F. Speede, soliciting the patronage of the Society for his proposed new work, the "Floriculturist," which he intends publishing as an appendix to his "New Indian Gardener."

Resolved,—That Mr. Speede be requested to furnish a copy of the work, on its publication, when the Society will be better prepared to consider his application.

5. From Mr. C. Wheeler, Hazareebaugh, affording some further particulars respecting his coffee plantations:—

"In the progress of my coffee cultivation at this station, I am happy to inform you, that up to this period I have succeeded in realizing every thing I proposed or could have hoped. Since I last had the honor to address you, I have banked in, and trenched, about 20 biggas of ground in the immediate vicinity of my nursery, which having lain fallow for a period of about 7 or 8 years, is highly fitted for the purpose of a plantation. This will contain about 6,000 trees, which I am now engaged in filling it with, having already planted 3,000. I have adopted the method of making holes 3 feet in diameter, and 3 feet deep, and refilling them with black earth and sand, so as to form a light soil for the plant while arriving to the age of fruiting. I have planted my trees at right angles 10 feet apart, and when finished, the plantation will have a very beautiful appearance. This my first plantation will be finished in the course of 15 days. I shall still have upwards of 23,000 plants remaining in nursery ready to be placed into plantation next rains. I have engaged a village in this vicinity, possessing 5 or 600 biggas of land highly suited to the extension of my cultivation, which having secured 4 maunds of seeds, from Mocha stock, (my present cultivation is all from

Mocha stock,) I am prepared to carry into effect to any extent under two lacs, in the event of parties joining to render such an extension expedient.

"With a view of lightening the expenditure necessary to the cultivation, previously to its becoming profitable, I am desirous of adopting, if possible, particularly as I shall have much spare land, some other cultivation which would be likely to effect this object, and have been thinking of safflower. As yet I have not been able to collect much information upon the subject of the culture of this valuable staple, but should feel much indebted to your kindness if you would be pleased to furnish me with any you may possess, and also with a small supply of the seeds, or roots, should it lay in your power to do so, and if not, if you could inform me where such may be purchased."

The Secretary mentioned, that he had furnished Mr. Wheeler with a copy of an article by Dr. Geo. Lamb "on the cultivation and preparation of safflower in the neighbourhood of Dacca," published in the second volume of the Society's Transactions, and had taken steps to meet his request for seed.

6. From Mr. C. Morrison, planter and estate proprietor, Ceylon, requesting to correct a statement in Mr. Wheeler's communication to the Society, on the subject of his experiments in coffee planting, which was published in the precis of proceedings of the general meeting held in September, in which his (Mr. Morrison's) name is mentioned as an authority for such statement; and further requesting, that the two following paragraphs of his present note may be published in reference to such correction:—

"What I really did say to Mr. Wheeler was, that the coffee tree, when planted out in the open grass lands of Ceylon, never lasted above 3 or 4 years, and I mentioned this, as a fact within my knowledge, for the guidance of Mr. Wheeler, who had planted or was about to plant, land of a similar description, instead of selecting good virgin soil, upon which the primitive forest had been recently felled and burned off.

"The latter part of Mr. Wheeler's statement is correct. The coffee tree in Ceylon, when yielding its second crop, is in full bearing."

(Tuesday, the 30th October, 1849.)

A Special Meeting of the Society was held in the Society's Rooms, Metcalfe Hall, on Tuesday, the 30th October, 1849.

William Storm, Esq., Vice-President in the chair.

The Vice-President opened the business of the Meeting by stating, that it was summoned, on a requisition from certain Members of the Society, to consider the report of the Machinery Committee, with reference to the prize

of five thousand rupees offered by the Government of India for an improved cotton-cleaning machine.

The report and the form of advertisement appended thereto having been read, and discussed, it was proposed by Mr. W. G. Rose, seconded by Mr. Arthur Adams, and resolved,—" That the report of the Machinery Committee be adopted and referred to the Supreme Government for approval."

Col. Sage desired to give the following, as a notice of motion for the next general meeting :—

" That the sum of one hundred pounds be remitted to Messrs. Grindlay and Co., the Society's Agents in London, for the payment of the advertisements in Great Britain and on the Continent of Europe; and that Dr. Huffnagle and the Secretary be requested to adopt the necessary steps for giving full publicity to the advertisements in America and India, both in the English and Native languages, due means being furnished by the Society to meet the expense of so doing."

It was also moved by the Hon'ble Mr. Bethune, as a notice for the next general meeting,—" That the Society incur the necessary expense for sending about five hundredweight of seed-cotton to its Agents Messrs. Grindlay and Co., for the purpose of offering samples to intending competitors at such price as may be sufficient to cover the prime cost and expense of transmission."

Lastly, it was proposed by the Hon'ble Mr. Bethune, seconded by Mr. W. G. Rose, and resolved,—" That application be made to Government, requesting that as much of the Banda cotton which has been sent down for the use of Mr. Mather as is not needed for his experiments be placed at the disposal of the Society, for the purpose of enabling them to offer samples to intending competitors for the prize, in accordance with the terms of the resolution, of which notice was last given."

(Thursday, the 8th November, 1849.)

William Storm, Esq., Vice-President, in the chair.

Elections.

John Halliday, Esq., and John Lyall, Esq.

Proposal.

Ferdinand Mayer, Esq.,—proposed by Mr. J. A. Burkinyoung, seconded by Mr. Wm. Cragg.

The motion of which notice was given at the Special Meeting by Col. Sage, to the effect, " that the sum of one hundred pounds be remitted to Messrs.

Grindlay and Co., the Society's Agents in London, for the advertisements in Great Britain and on the Continent of Europe," &c., was withdrawn by the mover, in favor of the following, which was seconded by Mr. Staunton, and agreed to, namely :—

"That a Committee of the following members be appointed to determine on the best mode of giving publicity to the advertisement connected with the offer by Government of 5,000 Rs. for an efficient cotton-cleaning machine, —namely, Dr. Falconer, Dr. Huffnagle, and Mr. W. G. Rose."

Col. Sage further desired to give the following as a notice of motion for the next meeting :—

"That a sum not exceeding three hundred rupees be declared available to carry out the resolution of the above Committee, if such expenditure should be reported necessary."

The motion of which notice was given by the Honorable Mr. Bethune, at the special meeting, namely :—

"That the Society incur the necessary expense for sending about five hundredweight of seed-cotton to its Agents Messrs. Grindlay and Co., for the purpose of offering samples to intending competitors, at such price as may be sufficient to cover the prime cost and expense of transmission,"—was taken up by Mr. Staunton, in the absence of the mover, but its consideration was deferred to the next general meeting.

A report was read from the Bye-Laws Committee, submitting a Draft of the proposed new Code of Rules, and recommending that the same be printed and circulated among the members, previous to its consideration by the Society; whereupon, it was moved by the Honorary Secretary, seconded by Baboo Peary Chand Mittra, and resolved,—"That the Draft of the proposed new Code of Rules be printed and circulated among all the resident members, and that the same be considered at the next general meeting."

Presentations.

The following presentations to the library, garden and museum, were next announced :—

1. Papers and Proceedings of the Royal Society of Van Dieman's Land, vol. i., part 1 : and Report of the same Society for 1848, with a copy of its Rules. *Presented by the Government of India, through the Colonial Secretary, on behalf of the Council of the above named Society.*

In forwarding the above reports, the Council of the Society express their earnest wish "for the establishment of a direct system of intercourse, mutual co-operation, and interchange of publications, and of the productions peculiar to India and this colony; a system of reciprocity which it is manifest, must tend to further the interests, views and objects of all such associations."

2. A box of date plants, some Soudan beans, Malta *birsim* or clover, and a curious pod or bean from Fezouylon. *Presented by Dr. Abbott, of Cairo.*

The Soudan beans forwarded by Dr. Abbott is, the well known earth-nut (*Arachis hypogea*). The bean from Fezouylon, on the White Nile, Dr. Abbott describes as being very scarce : it is edible, but not known in Egypt.

The Secretary intimated, that three only of the 25 date seedlings are likely to thrive : neither the clover, nor seed contained in the pod from Fezouylon, have germinated.

3. A few plants of a new description of *Clerodendron* from China. *Presented by Mr. George Bartlett.*

4. A few pummello and mango grafts of a superior kind. *Presented by Mr. Joseph Agabeg.*

5. Orange seedlings and layers of *Banisteria laurifolia* and *Buginvillæa spectabilis. Presented by Mr. F. D'Aguiar.*

6. Samples of South Australian grains, of flower and shrub seeds, of gum, salt and soap, and a variety of specimens of wood. *Presented by Mr. Charles McCallum.*

The following is an extract of Mr. McCallum's letter :—"The first of these specimens are samples of South Australian grain—wheat, barley and oats,—grown within a circle of 25 miles of Adelaide, and exhibited at their show in February last.

I regret that I was not able to obtain a sample of the first prize wheat at *this* show, from my being late in attending, but you will find accompanied a sample of the wheat which carried the prize the three former years. On the paper of the different samples, you will observe the particulars written.

The next are three separate parcels of flower and shrub seeds,—No. 1, from the Botanic Garden at Melbourne, Port Phillip. No. 2, from Mr. Bunce, the botanist; the particulars of this botanist's travels, when those were collected, you will find on a small printed slip of paper which accompanies the parcel, with also, a catalogue of the botanic names.

No. 3, is from the Botanic Garden at Hobart Town, Van Dieman's Land, the name is attached to each paper.

The next (No. 4,) is the native gum of South Australia. The other is the gum of the Port Phillip district; the natives eat this gum in large quantities, whether as medicine or to appease hunger, I cannot state, but I have seen them carrying it about with them, and use it freely.

No. 5.—Native salt, taken from Lake *Bolah*, a lake about 150 miles to the west of Melbourne, and 60 or 70 miles from the sea coast. The surrounding settlers all use this salt for their domestic purposes, and it only requires pounding to make it fit for domestic use.

No. 6.—Two pieces of soap manufactured at the establishment of Messrs. Jackson, Rae and Co., in Melbourne.

No. 7.- A parcel containing a variety of specimens of Australian timber wood, and some from Van Dieman's Land, and from New Zealand."

7. Specimens of cloth and paper manufactured in the Jail at Etawah from the "cotton" of the "*Mŭddār*" or "Ag" *(Asclepia gigantea). Presented by E. H. C. Monckton, Esq.*

Communications on various subjects.

The following letters were also submitted :—

1. From W. Grey, Esq., Under-Secretary to Government of India, forwarding a report from the Resident at Indore, regarding the culture of cotton in Malwa.

2. From E. B. Thomas, Esq., Collector of Coimbatore, furnishing replies to queries respecting the mode of cleaning cotton adopted in the Coimbatore district.

3. From Lieut. John Eliot, Cawnpore, adding a few more particulars to his former communication regarding his mode of raising strawberries.

4. From E. H. C. Monckton, Esq., giving some interesting particulars regarding his attempts at manufacturing cloth and paper from the cotton of the *Mŭddār*.

The four above mentioned communications were referred to the Committee of Papers.

5. From Capt. Scott, Secretary Military Board, forwarding the cotton-cleaning machine alluded to in his former communication, belonging to the Society.

6. From Mr. James Carter, Seedsman, London, advising the despatch of the Society's consignment of English flower seeds.

(Thursday, the 13th December, 1849.)

Dr. Charles Huffnagle, Vice-President, in the chair.

Election.

Ferdinand Mayer, Esq., who was proposed at the last meeting, was duly elected a member of the Society.

Proposals.

William Muir, Esq., Civil Service, Agra,—proposed by Mr. R. H. S. Campbell, C. S., seconded by the Honorary Secretary;

Capt. R. H. Baldwin, Horse Artillery, and Lieut. John Ross, 71st N. I.,—proposed by Capt. F. C. Burnett, Artillery, seconded by the Honorary Secretary.

Presentations.

The following presentations were announced :—

1. A further supply of *Carob* seed *(Ceratonia siliqua). Presented by Dr. Henry Abbott, of Cairo.*

2. A quantity of Mooltan date seed *(Phœnix dactylifera). Presented by M. P. Edgeworth, Esq.*

3. Seeds of "*Ansenna*" *(Pterocarpus dalbergioides?)* tree, and a description of fruit called "*Boonli Carinjam,*" *(Pongamia —— ?)* both from Penang. *Presented by Joseph Agabeg, Esq.*

All the above seeds are available to members.

4. A quantity of Dacca safflower seed, from J. G. French, Esq., forwarded chiefly with the view of meeting a requisition from Mr. Wheeler, of Hazareebaugh.

5. A collection of plants from Penang and Singapore, consisting of pine-apples, betel and cocoanuts, durians, mangosteens, &c. *Presented by Joseph Agabeg, Esq.*

Some of these plants have arrived in good condition; several in a sickly state, and a few quite dead. The cocoanuts (one hundred in number,) have been procured from the plantation of Sir Joseph D'Almeida, at Singapore.

6. A cottage saw-gin, for India, constructed under the direction of the Manchester Commercial Association. *Presented by the Government of Bengal.*

7. A Bhootan knife. *Presented by Mr. Samuel Wright.*

Eight sorts of well grown *Chrysanthemums*, in full flower, from Mr. George Bartlett's garden, were also placed on the table. Mr. Bartlett states that, with the exception of one sort—the true Indian—the others are all imported and quite new to our gardens.

Cotton-cleaning Machine.

The motion of which notice was given by the Hon'ble Mr. Bethune at the Special Meeting, held on 30th Oct.,—"that the Society incur the necessary expense for sending about five hundredweight of seed-cotton to its Agents Messrs. Grindlay and Co., for the purpose of offering samples to intending competitors [for the Government prize of 5,000 Rs.] at such price as may be sufficient to cover the prime cost and expense of transmission,"—was brought forward, seconded by Mr. Earle, and carried.

Read a letter from W. Seton Karr, Esq., Under-Secretary to Government of Bengal, intimating the "approval by the Government of India of the advertisement, [drawn up by the Machinery Committee,] which the Society proposes to publish regarding the prize to be offered for an improved cotton-cleaning machine." Further, intimating that Mr. Mather has been requested by the Government of India to make over to the Society any portion of the Banda seed-cotton which he may not require for his own experiments.

Mr. Mather, who was present, having informed the meeting, that he could supply about five hundredweight of the seed-cotton above referred to, was requested to oblige the Society by having the same properly packed for transmission to Messrs. Grindlay and Co., which he agreed to do.

The report of the Committee, appointed at the last meeting, to determine on the best mode of giving publicity to the advertisement connected with the offer by Government of 5,000 Rs. for an efficient machine for separating cotton-wool from the seed, was next read. The Committee submit a short advertisement for publication in certain newspapers and periodicals in India and Europe, of which a list is also given; and suggest, that 500 copies of the long advertisement, which has met the approval of Government, be printed and disposed of in the following manner:—

150 copies to be sent to Dr. Royle.

150 copies to Messrs. Grindlay and Co.

100 copies to Dr. Huffnagle, for circulation in the United States.

100 copies to be retained to meet applications in this country, from intending competitors, and from members or others desirous of sending them to particular institutions or individuals.

The Committee further note a few suggestions for making this offer as prominently known as possible, in Great Britain; and they recommend that the sum of £30 be remitted to Messrs. Grindlay and Co. to meet the cost of advertisements in Europe. As regards the United States of America, the Committee are happy to add, there will be no expense, Dr. Huffnagle having offered, as Consul, to arrange for the publication of the advertisement, &c., in that country, free of all cost to the Society.

Proposed by Mr. Staunton, seconded by Mr. Mather, and resolved, that the report of the Committee be confirmed.

The motion of which notice was given at the last meeting by Col. Sage, "that a sum not exceeding 300 Rs. be declared available to carry out the resolution of the Advertisement Committee, if such expenditure should be reported necessary,"—was not put to the vote, the adoption of the above report rendering it unnecessary.

Nursery Garden.

Read a report from the Garden Committee regarding the present state of the Nursery. The Committee report favorably of the orchard, (now extended to 20 beegahs,) and of the flower garden. They recommend an application to the Superintendent of the Botanic Garden for cutting down certain large trees which, at present, materially interfere with the plot set apart for a kitchen garden. They state, that there has been no demand this season for sugar-cane; but as the cultivation is very limited, being confined to one beegah, they recommend its being retained, with the view of keeping the stock in the garden in the event of any future demand for particular sorts The Committee report the entire failure of the Cape peas which were sown in a large plot of ground, for raising seed for distribution next year. The American peas, sown in another large plot, have germinated tolerably well. The Gardener also reports, that nearly all the *vegetable* seeds received this

season from America, and most of those from the Cape, have germinated readily, but only a few sorts of American *flower* seeds have come up: while, with the exception of one kind, the batch of English flower seeds received from Mr. Carter, by the October Steamer, has vegetated exceedingly well. As regards the School, the Committee add, that the principal object for which it was established, rather more than two years ago, has been frustrated, from the circumstance of the lads refusing to leave their homes, though offered pay double of what they are now receiving. The Committee state, that they are, unfortunately, powerless in this respect, it being impossible to enter into any kind of contract with the parents or other relatives of the scholars: but as the expense of maintaining the school is comparatively trifling, they are not prepared to recommend its abolition.

The Committee close their report with a few recommendations for the repairs of the Conservatory, School-house, &c.

Proposed by Baboo Peary Chand Mittra, seconded by Mr. Staunton, and agreed, that the report of the Committee, in all its details, be confirmed.

Draft of proposed Code of Bye-Laws.

The Honorary Secretary stated that, in accordance with the resolution passed at the last general meeting, the draft of the proposed new Code of Rules had been printed and circulated among all the resident members, previous to its consideration at the present meeting; and that extra copies were now placed on the table for reference. He further submitted a letter to his address from the Chairman of the Committee for the revision of the Rules, in which Dr. McClelland states, that some of the members of the Committee are of opinion, that "the members of the Society residing in the Mofussil, as well as those resident in Calcutta, should have an opportunity of becoming acquainted with the proposed Code of Rules prior to their adoption or rejection"

After some little discussion it was proposed by Mr. Alfred Turner, seconded by Mr. J. H. Mather; "That the consideration of the Bye-Laws be deferred to Friday, the 28th December, when a *special* meeting of the Society be called for that purpose, at half-past nine A. M."

Baboo Peary Chand Mittra moved the following amendment:—"That a *special* meeting be called for the purpose of taking the Bye-Laws into consideration, a fortnight after the publication of the Rules, in the newspapers for the information of the Mofussil members."

The amendment was put to the vote, and negatived.

The original motion was then submitted, and carried.

Communications on various subjects.

The following communications were also submitted:—

1. From C. J. Bird, Esq., Acting Collector, Tinnevelly, submitting replies to queries regarding the mode adopted in that district of separating cotton-wool from the seed.

2. From Mr. C. Wheeler, Hazareebaugh, presenting drawings of a mill constructed by him for husking coffee, with explanatory notes.

These two letters were referred to the Committee of Papers.

3. From Dr. Robert Wight, Superintendent Government cotton farms, dated Coimbatore, 30th October, promising to send a *churka,* and replies to the Society's queries about the cost, &c. of separating cotton-wool of the seed. Intimates that the Court of Directors have issued instructions for the continuance of the farms for two years longer, but on a somewhat reduced scale, and directed him to remain to conduct the necessary trials.

4. From Mr. C. Wheeler, Hazareebaugh, giving further accounts of his progress in cultivating the coffee plant, and his attempts at constructing machinery for pulping and husking the berry:—

"I have already 5,000 coffee plants transplanted out 10 feet apart, the whole presenting a beautiful appearance; though some of the trees of two years' growth were almost too large for transplanting. I find if the roots are at all injured, that it destroys the plant past recovering; whereas, if carefully taken from the ground, with plenty of mould around its roots, it never turns a leaf.

"After considerable thought and labor, it being the first time I ever studied mechanism of any description, I have succeeded in constructing the model of a pulping mill, which can be turned by either manual or animal labor. I intend to work it by a mule or pony; and shall also apply the sails of a wind-mill to the purpose; this will enable me to shell a large quantity of berries daily, during the critical season of curing, &c.

"I have not yet hit upon a proper machine for *peeling off the parchment skin,* and have had no guide for either this, or the before mentioned mill, excepting a few words in the *London Encyclopædia,* which merely says of the peeling machine. "This is a *wooden grinder turned vertically upon its trundle by a mule.* In passing over the coffee it takes off the parchment skin, which is nothing but a thin skin that detaches itself from the berry, in proportion as it grows dry." Perhaps some one reading this paper will kindly enlighten me as to the meaning of the words in italics, which I confess are too obscure to strike my understanding.

"Hitherto the Chota Nagpore coffee berry has been cleaned merely by a native "*dhenky*" or "*soorkee*-pounder," no wonder, therefore, that the *getting up* has been always so badly spoken of—and if not properly dried, the flavor of course is deteriorated, as was the case with half a maund that I got over. You will be sorry to learn, since the departure of Colonel Ouseley, to whom agriculturists are so much indebted, that the Government coffee garden at Chota Nagpore has been given up. However, I was kindly permitted to purchase all the young plants; viz. 1,500 in the second year and 6,000 seedlings of last year's sowings, of the same age as my own 10,000 seedlings. This number has therefore been saved from destruction,

and only just in time, for the 1,500 larger plants had been so neglected, that I fear many of them are past recovery. I have further endeavoured to procure all the berries now on the trees; and which I apprehend are perishing for want of attendance, with a view to profit by experience in curing the berry, before my own trees yield, as also to try to get up a better staple for the market than has hitherto been sent to you. But I fear my offer was too small, as it has not met with a reply. May I take the liberty of suggesting, that if the Government does not require the coffee, rather than see it rot on the trees, I shall be happy to pluck, and cure it, for the reasons above stated, at the same time it will be some mark of encouragement in my attempt to carry out the introduction of this valuable staple, into the Bengal Presidency. May I be pardoned for further suggesting that a word from the Society will have the desired effect. There is however no time to be lost, as the coffee ripens in January. I am induced to communicate to you at some length on this subject, as I find the accounts as reported at your meetings have attracted attention, and I have had application from a gentleman at Gorruckpore for acclimated Mocha coffee seeds, with which I shall be happy to comply, as well as to other parties requiring them. If the Society obtain the grant of the berries, I shall be glad to pluck, free of charge, and send any quantity of seed the Society may require to receive, as also of course good samples of my first attempts at getting up "coffee."

"I may as well mention here for general information, that the seeds cannot be sown too fresh; their germinating properties deteriorate in a fortnight, and after a month, it comes up with much tardiness and loss. It would be better therefore to have it direct from me at Hazareebaugh. The fresher the seed is, the sooner it germinates, varying from 2½ to 6 months, during which time it should be so copiously watered as never to allow the beds to dry. The nursery should also be in good shade throughout, though not so as to prevent a free circulation of the air. Not having sufficient shades, I was obliged to erect temporary *choppers* over the seed beds, which were removed when the rains set in. In consequence of the extraordinarily small quantity of rain which has fallen this year; viz. only 27 inches by the Government Register, my seedlings are not so high as they would have been in a regular season. They average about 6 inches."

Resolved,—That an extract of Mr. Wheeler's letter be submitted for the favorable consideration of the Government of Bengal.

[Mr. Wheeler's request has been responded to by Government in a liberal manner.]

5. From Lieut. Col. Napleton, submitting copy of the proceedings of a meeting of the Branch Agri-Horticultural Society of Bhauglepore, consequent on his approaching departure from that station, and relinquishment of the Honorary Secretaryship. Referred to the Committee of Papers.

h

6. From Mr. H. Fenwick, Moulmein, dated 21st November, advising despatch of a few plants per *Tenasserim*. Suggests the introduction into Bengal of the cocoanut and plantain of the Straits.

The Secretary mentioned, that the above mentioned plants had not been received.

Before the meeting separated, it was proposed by the Honorary Secretary, seconded by Mr. Staunton, and agreed, that the members of the "Floricultural Committee," and of the "Garden Committee," report conjointly to the next general meeting regarding the consignments of vegetable and flower seeds for next season.

Report of the Agricultural and Horticultural Society of India, for the year 1849.

In accordance with established usage, a brief summary of the various objects which have engaged the attention of the Society during the year, is now submitted.

The subject which first claims attention—that on which the welfare of the Institution so materially depends—is the state of its subscription list. It is therefore satisfactory to record an accession of forty-nine names since the submission of the last report. Of these, 8 are Civilians in the service of Government, 13 are Merchants, 11 Military Officers, 5 Medical Officers, one an Indigo-planter, 3 Zemindars, 6 of the Legal profession, and two in the Educational line. The losses from deaths and resignations, though considerable, have been less than last year. There have been seven deaths and forty resignations, which, with five struck off for non-payment of subscription, make in all 52.

The distribution of the Members, as they now stand, may be referred to the following classes :—

CLASSIFICATION.	In 24 former years.	In 1845.	In 1846.	In 1847.	In 1848.	In 1849.	Gross Total.	Total real number at the close of 1849, after deducting lapses.
Honorary Members, ...	11	0	1	0	1	0	13	10
Free Members, ...	2	0	0	0	0	0	2	2
Corresponding Members, ...	0	0	1	0	0	0	1	1
Civilians in the service of Government, .	223	9	13	15	22	8	290	175
Merchants and Traders, ...	186	15	14	12	13	10	250	133
Indigo and other Tropical Agriculturists,	188	2	15	6	5	1	217	74
Military Officers, ...	147	13	10	11	11	11	203	101
Medical Officers, ...	78	2	0	2	3	5	90	26
Asiatics, ...	58	6	2	14	5	6	91	44
Clergy, ...	13	1	1	0	0	0	15	3
Law Officers, ...	38	2	1	0	0	6	47	22
Miscellaneous, ...	9	0	0	2	0	2	13	10
	952	50	58	62	60	49	1232	601

If from this return of 601 Members, 37 who have compounded for their subscriptions be deducted, with 10 Honorary, one Corresponding, two Associate Members, and 154 Absentees,* there remain 397 as the actual number of paying members on the strength of the Society.

* The departures from India during the year have been 25, and the returns 14. But as ten of these returned at the close of the year, their names have not been introduced in the paying list of 1849 : they will, however, be borne on that of 1850.

The following are the Members whose demise the Society has to record:—

Major H. Macfarquhar, Assistant Commissioner, Tenasserim Provinces; Mr. E. Boyle, Merchant, Calcutta; Mr. Brian Hodgson, Deputy Collector; Mr. George Wood, of Calcutta; Major Hugh Robison, of the Nizam's Service; Mr. Thomas Brae, Indigo-planter, Jessore; and Mr. B. Harding, late of Calcutta.

It was stated in the last report, that the lamented death of Sir John Grant would, it was to be feared, prevent the Society obtaining a likeness of its late President. Circumstances having proved this apprehension to be well founded, it was agreed at the March meeting,—the proposal having been previously circulated and concurred in by the subscribers,—to invest the amount realized, namely, Rs. 1,769, in a Government Promissory Note, and the accruings of interest thereon to be applied for the manufacture of a gold medal, to be styled the "Grant medal," to be awarded for such objects as may be hereafter periodically determined on. The amount has been, accordingly, so invested, and lodged in the custody of the Government Agent.

Passing from these primary details to other matters, the Nursery Garden may be first noticed. It has been duly attended to during the year, more especially in the Orchard department, which has been considerably extended, and now comprises about one-third of the whole area, or nearly 25 beegahs. Mangoes, litchees and peaches, of the best sorts procurable, occupy about two-thirds of this space; while the remainder is filled with loquats, Avogado pear, pumplenose, and a few other kinds of fruit trees. The distribution of mango grafts has been continued throughout the year, and the Committee hope to add litchee and peach grafts to the stock available to members next year. The Society is mainly indebted to Mr. Maclean for the stock of litchee trees: that gentleman having very kindly allowed grafts to be taken from his garden at Bally, in the vicinity of Calcutta, which affords, perhaps, the best kinds to be found in Bengal.

The plot of ground set apart for flowering trees and shrubs has also been increased to meet an augmented demand for such plants. The raising of a hollow belt of sward on the south side of the

flower garden, to a level with the adjoining ground, has materially improved the appearance of this portion of the Nursery.

But while the ornamental departments have been attended to, the useful have not been overlooked. A spot of ground which was previously occupied as the Kitchen Garden, has been set apart for certain useful cultures, for which the demand is constant, such as Guinea-grass, tapioca, arrow-root, tobacco, &c. It is proposed to form a Kitchen Garden in another and more open part of the Nursery, which was formerly under cane cultivation, the present site being deemed unsuitable.

The demand for sugar-cane having been equally as limited as in 1848, it has not been considered necessary to increase the cultivation, which is, at present, confined to one beegah of ground: the plots formerly allotted for this staple are now occupied by fruit trees.

In regard to the little School for Gardeners, to which allusion was made in the last summary, the Committee report, with regret, "that the principal object for which it was established, namely, to "supply gardeners to Mofussil Members, has been frustrated, from "the circumstance of the lads refusing to leave their homes, "though offered pay double of what they are now receiving." They add, "that, they are, unfortunately, powerless in this respect, "it being impossible to enter into any kind of contract with the "parents or other relatives of the boys;" but as the expense of maintaining it is trifling, not exceeding Rs. 25 per mensem, they are not prepared to recommend its abolition, for it may be the means of adding to the present limited number of practical gardeners in Calcutta, and its vicinity.

In addition to the assistance afforded by Mr. Maclean, as before adverted to, the Society is also indebted to several other Members and individuals for contributions of plants and seeds for the Garden during the past twelve months; more especially to Mr. Joseph Agabeg, for a collection of fruit trees and ornamental plants from Penang and Singapore; to Dr. K. M. Scott, for grafts of his fine peach, and Seville oranges; and to Mr. R. W. G. Frith, for a small assortment of West Indian plants.

As respects the Horti-floricultural department, it should be mentioned that only two exhibitions of fruits and vegetables have been

held during the year; namely, in February and May; and the same number of flower shows. The lateness of the season prevented the usual show of the former in October, and of the latter in December. The prizes thus reserved will be available for next year's exhibitions. The February show of fruits and vegetables was considered encouraging, and that of flowers, held in the same month, decidedly the best that has yet taken place. With the view of improving the arrangements for future flower shows, and of securing the services of Members most competent to act as judges, a "Floricultural Committee" was appointed in the early part of the year, as an addition to the other Standing Committees. The Society further resolved, on the same occasion, to invite amateur gardeners to exhibit, at the monthly general meetings, plants of rarer sorts, such as are not likely to be in blossom at the period when the shows are held, and confirmed the schedule of medallion prizes drawn up by the Committee for that purpose. The proposal has not, however, been responded to, or so very partially, that there is nothing to report under this head.

The supplies of imported seeds have not, in the main, been so good this year as the last. The consignment of flower seeds from Mr. Carter of London, has, it is believed, given general satisfaction; the same remark is applicable, or nearly so, to the *vegetable* seeds from the United States; but the *flower* seeds from the same quarter have been unfavorably reported on, more than one-half the assortment having failed to germinate. The vegetable seeds from the Cape have been likewise pronounced of indifferent quality, especially the peas. A Committee was appointed at the December meeting to report regarding the consignments for 1850, with special reference to the complaints above referred to.

The Society has been in active correspondence during the year with the Branch Institution at Bhauglepore. It would take this opportunity to place on record its sense of the services rendered to the cause of Agriculture and Horticulture by Lieut.-Col. Napleton, whose departure from Bhauglepore, consequent on his promotion, has deprived that Branch of a most indefatigable and able Secretary. Established, principally by his exertions, the Bhauglepore Society, it may truly be remarked, owes its present prosperous

condition to his untiring interest and zeal in its behalf. To mark its acknowledgment of the value of such services, this Branch Institution has resolved to place Col. Napleton's name on its books as a "permanent Honorary Member," and has determined that he be entitled, at the same time, "to all the privileges of a regular Member."

The donations to the Museum, since the submission of the last report, have been comparatively limited. The principal are a collection of woods from Australia, presented by Mr. Charles McCallum; another from the West Indies, from Mr. Wm. Storm; and a cottage saw-gin, received from the Government of Bengal. The Society has also to reiterate its acknowledgments to Dr. Abbott of Cairo, for sending plants and seeds of the Arabian date (*Phœnix dactylifera*), and a further supply of *Carob* seed (*Ceratonia siliqua*). For the last named seed the demand has been great, particularly from Members resident in the more arid districts of India.* The Society has endeavoured to meet these calls to the best of its ability, under the impression, that the introduction into such localities, of a tree not affected by drought, cannot fail to prove a great blessing to the inhabitants.

Allusion was made in the last report to the award of a gold medal and Major Jenkins' prize of Rs. 500 to Mr. J. H. Mather, Civil Engineer, for "the successful results of his improved *churka*, as respects the superior cleaning of the cotton, and the quantity turned out in a given time." The competition on that occasion was confined to machines on the roller principle. The subject was mooted again in the early part of the year by a member, (Mr. Mornay,) who suggested the offer of another prize to the inventor

* Lieut. Col. Dixon, Supt. of Ajmere and Mhairwarrah, states, that the supply he has received from the Society will admit of his extending plans for the introduction of the tree in that tract of country, which so frequently suffers from famine: and Major Spottiswoode, 1st Asst. Studs, N. W. P., to whom a large supply of seed has been lately sent, writes: "From the account given in the last annual report of the Society, I am inclined to think the *Carob* tree would thrive here, and eventually prove a great blessing to this locality (Haupur); our seasons have been very irregular ever since that dreadful one of 1837-38, crops have generally been indifferent, and forage each year for grazing cattle more scanty."

of a further improved machine, "unrestricted by any particular mechanical principle." The matter was referred to the Machinery Committee, who submitted a report favorable to the proposition at the July general meeting, and suggested, further, an application to the Government of India for its co-operation. The report having been previously published in the form of a pamphlet, was brought forward and passed at the following monthly meeting. At the general meeting in October, a reply from the Under-Secretary to the Government of India to the Under-Secretary to the Government of Bengal was read, announcing, on the part of the President in Council, his willingness "so far to meet the wishes of the "Society as to consent that a reward of Rs. 5,000 shall be an-"nounced to be given on the 1st of March, 1852, to the inventor "of an improved cotton-cleaning machine, such as, in the opinion "of the Government, shall perfectly attain the principal objects in "view, as described in the 3rd para. of the report rendered by the "Society's Committee."* And further,—"that in case of no ma-"chine being adjudged worthy of the prize offered, the President "in Council will be ready to accord a smaller prize for any ma-"chine of merit in proportion as such machine may be pronounced "more or less to have attained the objects aimed at." In addition to this liberal prize, the Society has determined to adjudge its gold medal for the same object, and has further offered the sum of Rs. 250 (placed at its disposal by Major Jenkins, Agent to the Governor General in Assam,) and its silver medal, for an "efficient cotton-threshing machine, adapted to free from trash either seed-cotton or cotton-wool of the indigenous kinds."

An advertisement, notifying the conditions under which these prizes will be awarded, has been drawn up, and steps taken for its distribution throughout India, Europe, and the United States of America.

As connected with this subject, it may be mentioned in this place, that the Society has made arrangements to obtain full-sized

* That is, it is to be not only perfect in its action in divesting cotton-wool from the seed, but also to possess the several qualities of expedition, simplicity, and comparative cheapness, so necessary to render it likely to come into practical use.

working models of all machines for separating cotton-wool from the seed known to be in practical use: and further that, at the suggestion of Major Jenkins, it has applied to Messrs. Ransome and Co., of Ipswich, for priced lists and drawings of agricultural machines, with the view of obtaining, hereafter, for its museum, models of such as are likely to be applicable to Indian cultivation.

In reference to the particulars noted in the last summary, regarding the probability of the "*Kunchoora*" of Bengal (*Urtica tenacissima*, Roxb.) being the plant, the fibres of which afford the material known as the "Grass-cloth" of China, it is gratifying now to add, that the receipt of specimens from Dr. Macgowan, the Society's correspondent at Ningpo, has set the question at rest; Dr. Falconer, Superintendent of the H. C. Botanic Garden, Calcutta, to whom the specimens were referred, having reported their identity to the Society. It now remains for individuals, interested in such matters, to devise a more efficacious and economical mode for separating this fine and strong fibre from the bark. This difficulty overcome, it might successfully compete with the raw material from China, which is now being imported into England, and is becoming extensively employed, in equal proportions with sheep's wool, for the manufacture of certain descriptions of fabrics.

Before concluding this brief summary, it may be well to note that, a new Code of Bye-Laws has been drawn up by a Committee specially appointed for that purpose, and that the same, with certain modifications, was passed at a special meeting held on the 26th December last.

Report of the Finance Committee.

1. The Finance Committee, have the honor to lay before the Society, the following statements explanatory of the receipts and disbursements for the year 1849.

2. The total receipts amount to Co.'s Rs. 18,499-14-2, and the disbursements to Co.'s Rs. 16,608-2-6; and there has been invested in Government Securities the sum of Rs. 1,038-15, leaving, in part of the present cash balance in the Bank of Bengal, and in the hands of the Government Agent, the sum of Rs. 852-12-8.

3. The Vested Fund, with the addition above noted, now amounts to Rs. 20,233-5-4, as per account current of the Government Agent, dated 31st Dec. 1849.

4. The items of receipts and disbursements, so fully detailed in the annexed statement, do not call for any particular remark, with the exception of the sum of Rs. 704, exhibited as a receipt by sale of a surplus portion of seeds. This amount is unusually large, and it is therefore necessary to explain, that it has been caused by the circumstance of the Seedsman at Philadelphia having, by mistake of instructions, despatched one hundred *additional* packets of vegetable seeds; which extra number, on being ordered for sale, has realized upwards of three hundred rupees.

5. In respect to the arrears of subscription, your Committee desire to mention, that of the total amount of Rs. 8,968 shewn due at the end of 1848, there has been realized, during the year, the sum of Rs. 4,458. The balance of these arrears, with the addition of unpaid subscriptions of 1849, form a total of Rs. 9,053; (as per lists herewith submitted) and this sum is now due to the Society. The statements Nos. 1 and 4 will shew the very heavy arrears of Rs. 4,915; those of No. 1 are of so long standing, that the recovery may be considered very doubtful; those of No. 4 may admit also of great doubt as to their realization from the situations of the parties from whom they are due. The Committee, nevertheless, trust that the members in arrear will take steps to aid them in reducing considerably this comparatively large amount, the existence of which affects, in a great degree, the operations of the Society. They doubt not, the lately enacted Rule (see Ch. III. Sec. 7, of Code of Bye-Laws passed at the special meeting, held on the 26th December) in regard to subscriptions, will materially tend to prevent so large an accumulation of arrears for the future.

6. In conclusion, the Committee are happy to add, that the only liability, is the sum of Sp. Drs. 1,118 due to Mr. Landreth, of Philadelphia, for the last consignment of seeds, to meet which the present cash balance of Rs. 2,431 is amply sufficient.

CHARLES HUFFNAGLE.
M. S. STAUNTON.
ALFRED TURNER.

CALCUTTA:
31*st December*, 1849.

Statement of Receipts and Disbursements of the Agricultural and Horticultural Society of India, from 1st January to the 31st December, 1849.

RECEIPTS.

	Rs.	As.	P.	Rs.	As.	P.
From Members, subscriptions collected during the year for the ordinary purposes of the Society, ...	13,204	9	3			
,, Ditto, additional temporary subscriptions to assist in meeting the Society's proportion of the debt on the Metcalfe Hall, ...	86	0	0			
				13,290	9	3
,, Government annual donation, ...	1,045	0	0			
,, Ditto, monthly allowance for 12 months, at 135-13-6 per month,	1,630	2	0			
				2,675	2	0
,, Sir Lawrence Peel, donation to the Society for the year, to encourage the culture of flowers, &c, ...				400	0	0
,, Accruings of interest on fixed assets, ...				864	2	2
,, Proceeds of sugar-cane delivered from the nursery garden during the year, ...	63	4	9			
,, Ditto of mango grafts, ditto from ditto, ...	57	8	0			
,, Ditto of jute, ditto from ditto, ...	35	2	6			
,, Ditto of a portion of surplus Cape and American vegetable and English and American flower seeds, ...	704	2	3			
,, Ditto of copies of the Transactions of the Society, ...	96	0	0			
,, Ditto of copies of the Journal of the Society, ...	15	0	0			
,, Ditto of copies of Fenwick's Hand-book of Gardening, ...	72	0	0			
,, Ditto by advertisement inserted in Journal, ...	33	5	3			
,, Ditto of old seed boxes of sorts, ...	5	10	0			
,, Bengal Government, cost for 25 maunds of Bengal seed-paddy of sorts, supplied by the Society, ...	22	1	0			
,, Members, being the amount of freight and postage &c. on, boxes of seeds paid by the Society in 1848 and 1849, ...	15	0	0			
,, J. G. Bruce, to meet certain charges for procuring cotton seed from the Government farms at Coimbatore, ...	100	0	0			
				1,219	1	9
,, Assignee, Estate Alexander and Co., being the amount of fourth dividend at the rate of 3 As. 1 P. per 100 Sa. Rs. on the Society's claim of Co.'s Rupees, 26,436-2-10, ...				50	15	0
Total receipts, Co.'s Rs.				18,499	14	2
By Balance in the Bank of Bengal on 31st December, 1848, ...	1,133	14	3			
,, Ditto, in the hands of Government Agent on ditto, ...	444	15	8			
				1,578	13	11
Grand Total, Co.'s Rs.				20,078	12	1

DISBURSEMENTS.

Foreign Vegetable and Flower Seeds.

	Rs.	As.	P.	Rs.	As.	P.
By C. N. Villet, for Cape garden seeds, supplied in 1849, ...	1,374	0	0			
,, Mr. Jas. Carter, for English flower seeds and bulbs, ditto, ...	1,346	5	9			
,, ,, D. Landreth, for American garden, flower, cotton and maize seeds, supplied in 1848, ...	2,127	0	0			
				4,847	5	9

LIBRARY.

By Books purchased during the year for the library, ...	224 15 0	
,, Binding books during the year, ...	19 4 0	
		244 3 0

PRINTING.

,, Sundry parties for printing receipts, &c., ...		91 7 3

JOURNAL.

,, Bishop's College Press, for printing part 4 of Vol. 6, ...	392 8 0	
,, Lithographing and coloring plates and drawings for Journal, ...	402 0 0	
,, Paper for plates for ditto, ...	19 8 0	
		814 0 0

NURSERY GARDEN.

,, Ordinary expences incurred on account of the Nursery Garden, from 1st December 1848 to 30th November 1849, ...		2,641 1 0

ESTABLISHMENT.

,, Amount for establishment from 1st December 1848 to 30th November 1849, ...		4,534 8 0

MEDALS.

,, Hamilton and Co., for silver and gold medals, ...		340 2 0

PECUNIARY REWARDS.

,, Prizes to mallees for vegetables and fruits, at the exhibitions held on the 6th February, and 22nd May, ...	299 0 0	
,, Ditto to ditto for flowers, at the exhibitions held on the 1st March, and 17th April, ...	200 0 0	
,, Bhauglepore Branch Society, annual donation for 1849, ...	50 0 0	
,, J. H. Mather, prize for his improved cotton-cleaning machine,	500 0 0	
		1,049 0 0

FENWICK'S HAND-BOOK OF GARDENING.

,, P. S. D. Rozario and Co., for amount of trade allowance at 12 per cent. on 50 Rs. for 25 copies of Fenwick's Hand-book bought by them, ...	6 0 0	
,, H. Fenwick, proceeds of 45 copies of his Hand-book, ...	90 0 0	
		96 0 0

SOCIETY'S VESTED FUND.

,, The Government Agent, for the purchase of 2d 5 per cent. Note for Sa. Rs. 500, inclusive of interest, ...	528 12 9	
,, Ditto for ditto, of 4th ditto for Co.'s Rs. 500, ditto, ...	510 2 3	
		1,038 15 0

METCALFE HALL.

,, Burn and Co., for Society's proportion of quarterly allowance to them for inspecting the Metcalfe Hall Building, from May to July, 1849, ...	15 0 0	
,, Ditto, Society's half portion to them for sundry repairs executed to the Metcalfe Hall Premises, ...	7 8 0	
,, C. H. Dissent, ditto to him for two sign boards, &c. for the Metcalfe Hall, ...	17 4 0	
,, Sundry parties for various articles of furniture for the Hall, &c. including 12 large tables for flower shows, ...	403 11 0	
		443 7 0

ADVERTISEMENTS.

By Advertising in the public prints, notices of general meetings, of shows of flowers and vegetables, distribution of seeds, &c. &c. &c., ...		390 7 0
STATIONERY.		
,, Stationery for office books, and for the use of the office, ...	56 4 3	
,, Ditto, 6 reams of brown packing paper for packing seeds, ...	65 12 0	
		122 0 3
FREIGHT.		
,, Freight on boxes of seeds, books, &c. sent and received from Cape, England, America, &c., ...		155 12 6
COTTON SEED.		
,, Dr. R. Wight, being the amount cost incurred by him in the despatch of a quantity of cotton seed for the Society, ...		14 12 0
POSTAGE AND SUNDRY OTHER CHARGES.		
,, Postage on the Journal, on letters sent and received, and for petty expences, ...	379 0 0	
,, Extra packermen, for sub-dividing seeds, ...	8 13 0	
,, Presents to Constables for attending at horticultural and floricultural exhibitions during the year, ...	44 0 0	
,, A supply of mango grafts for the Society's nursery garden, ...	21 8 0	
,, A ditto of flower plants for ditto, ...	26 2 9	
,, Jardine, Skinner and Co., for freight on 24 bags of cotton seed from Madras, for J. G. Bruce, ...	33 6 0	
,, Dr. R. Wight, being the amount cost incurred by him in the despatch of a quantity of cotton seed for Mr. J. G. Bruce, ...	80 11 0	
,, For expences incurred in putting up, &c. three cotton-cleaning machines in the Metcalfe Hall, ...	33 0 0	
,, For 25 maunds of Bengal seed-paddy purchased for the Government of Bengal, ...	22 1 0	
,, Messrs. Grindlay and Co., in payment of sundry expences incurred by them for freight, postage, &c., also subscription for three years to their Agency, ...	145 7 0	
,, Advance, for cleaning and packing seed-cotton for shipment to Grindlay and Co., for the use of competitors for the prize offered for an improved cotton-cleaning machine, ...	30 0 0	
		824 0 9
Total Disbursements, Co.'s Rs.		17,647 1 6
,, Balance in the Bank of Bengal on 31st December, 1849, ...	2,161 7 9	
,, Ditto in the hands of Government Agent on ditto, ...	270 2 10	
		2,431 10 7
Grand Total, Co.'s Rs.		20,078 12 1

MEMORANDUM.

Disbursements.

To amount of Disbursements during the year 1849, as per Statement, ...			17,647	1 6
,, Balance in the Bank of Bengal on 31st December, 1849, ...	2,161	7 9		
,, Ditto in the hands of Government Agent on ditto, ...	270	2 10		
			2,431	10 7
Total, Co.'s Rs.			20,078	12 1

Receipts.

By amount of Receipts during the year 1849, as per Statement, ...			18,499	14 2
,, Balance in the Bank of Bengal on 31st December, 1848, ...	1,133	14 3		
,, Ditto in the hands of Government Agent on ditto, ...	444	15 8		
			1,578	13 11
Total, Co.'s Rs.			20,078	12 1

Liabilities.

Amount due by the Society for American vegetable, flower, cotton and maize seeds supplied in 1849, ... Sp. Drs.	1.117	92 0

Dependencies.

Amount invested in Government securities lodged in the Government Agency Office, ...	20,233	5 4
Amount of subscription in arrear, ...	9,053	1 9

Monthly Proceedings of the Society.

(Thursday, the 10th January, 1850.)

The Anniversary General Meeting of the Society was held on Thursday, the 10th January, 1850.

The Honorable Sir Lawrence Peel, President, in the chair.

The proceedings of the last general meeting were read and confirmed. The minutes of the *special* meeting, held on the 28th December, for the consideration of the proposed New Code of Bye-Laws, were also submitted. Previous to their confirmation, Mr. Willis Earle, as the proposer of the resolution passed at that meeting, in lieu of Section 7, Chap. 10 of the Draft, namely, that—"The President, Vice-Presidents, and Secretary for the time being, shall be constituted a Council for the general management of the affairs of the Society,"—now desired to move, as an addition to that resolution, the words—"their acts to be subject to the approval of the next general meeting." The resolution, with this addition, was seconded by the President, and carried unanimously.

Elections.

William Muir, Esq., Civil Service; Capt. R. H. Baldwin, Horse Artillery; and Lieut. John Ross.

Proposal.

Baboo Buddinauth Bysack,—proposed by Baboo Peary Chand Mittra, seconded by Baboo Ramgopaul Ghose.

Presentations.

The following presentations were announced:—

1. Griffith's Itinerary Notes of Plants collected in India and neighbouring countries; 1837 to 1842 (5 copies).

2. Griffith's *Notulæ ad Plantas Asiaticas.* Part 2. Cryptogamous Plants (5 copies), and *Icones Plantarun Asiaticarum.* Part 2 (5 copies). *Presented by the Government of Bengal.*

3. Madras Journal of Literature and Science, No. 35. *Presented by the Madras Literary Society.*

4. The Journal of the Indian Archipelago, for September, October and November, 1849. *Presented by the Editor.*

5. Two copies of the same work, for the same period. *Presented by the Government of Bengal.*

6. Journal of the Asiatic Society of Bengal, for August 1849. *Presented by the Society.*

7. An Anglo-Indian Domestic Sketch. *Presented by the Author.*

8. A quantity of cotton raised in Upper Assam. *Presented by H. Mornay, Esq., Secy. Assam Company.*

Mr. Mornay states, that this cotton, (part of which is in pod, and part separated from the seed by the Assam *churka*,) has been raised from the American seed, termed "Protective," which he received last year from the Society. (Referred to the Cotton Committee.)

9. A *Churka* from Indore. *Presented by R. N. C. Hamilton, Esq.*

10. A few plants from Moulmein. *Presented by H. Fenwick, Esq.*

11. A fine collection of plants from the Straits, consisting of a quantity of pine-apple, betel-nut, *Dacrydium, Podocarpus, Lycopodium, Geodorum, &c. Presented by Joseph Agabeg, Esq.*

Three-fourths of the collection presented by Mr. Agabeg, have reached in good condition. Of the plants from Moulmein, only one is in fair order,—the rest are very sickly.

A few very well-formed cut specimens of *Dahlias*, from Mrs. Macleod's garden, were placed on the table. It may also be here mentioned, that several fine plants of *Chrysanthemum*, in full flower, from this lady's garden, were sent for the inspection of the members at the late special meeting.

Election of Office-Bearers and nomination of Standing Committees.

The President intimated, that this being the Anniversary Meeting, the nomination of Officers for the current year should be entered on. He desired, previously, to call the attention of the meeting to a letter from Rajah Suttchurn Ghosaul, resigning his office of a Vice-President, in consequence of his frequent absence from Calcutta, and other constant engagements preventing his attendance at the sittings of the Society. The Members accordingly proceeded to the election, appointing Messrs. Staunton and Rose, Scrutineers, who reported the result to be as follows :—

Sir Lawrence Peel, President.

W. Storm, Esq., C. Huffnagle, Esq., Rajah Pertab Chunder Sing, Baboo Ramanauth Tagore, Vice-Presidents.

James Hume, Esq., Honorary Secretary.

A. H. Blechynden, Esq., Depy. Secy. and Treasurer.

The revision and strengthening of the various Standing Committees was next taken into consideration, and the following is the result :—

Sugar.—Messrs. G. U. Adam, James Cowell, William Haworth, T. F. Henley, and Alfred Turner.

Cotton.—Messrs. Joseph Willis, W. Earle, G. U. Adam, C. Huffnagle, and Edward Smith.

Silk, Hemp and Flax.—Messrs. Joseph Willis, G. T. F. Speede, J. W. Laidlay, W. G. Rose, and Capt. Thompson.

Coffee and Tobacco.—Dr. Strong, Messrs. W. Storm, James Cowell, and Col. Sage.

Implements of Husbandry and Machinery.—Col. Sage, Messrs. H. Mornay, J. M. Vos, J. H. Mather, and T. F. Henley.

Oil and Oil-seeds.—Dr. Mouat, Messrs. W. Haworth, H. Mornay, James Cowell, and Baboo Ramgopaul Ghose.

Grain Committee.—Messrs. Joseph Willis, W. Storm, W. Haworth, C. R. Prinsep, G. T. F. Speede, and Baboo Ramgopaul Ghose.

Nursery Garden Committee.—Messrs. J. W. Laidlay, W. G. Rose, W. Storm, W. Earle, and C. Huffnagle.

Fruit and Kitchen Garden Committee.—Messrs. G. T. F. Speede, W. G. Rose, J. W. Laidlay, Baboo Pearychand Mittra, and W. Earle.

Committee of Papers.—Col. Sage, Mr. J. W. Laidlay, The Hon'ble Mr. Bethune, Dr. Falconer, and Mr. Staunton.

Finance Committee.—Messrs. M. S. Staunton, J. W. Laidlay, Chas. Huffnagle, and A. Turner.

Floricultural Committee.—Dr. Falconer, Mr. W. H. Elliot, Col. Sage, Capt. Staples, and Mr. H. Alexander.

House Committee.—Messrs. W. G. Rose and J. H. Mather.

Horti-floricultural Exhibitions and Anniversary Dinner.

It was agreed, that the vegetable show be held on Saturday, the 2d of February, and the dinner on the evening of the same day. Further, that the flower show take place on Tuesday, the 26th February, the locality and hour to be hereafter determined on. It was also determined, that Messrs. Staunton, Huffnagle, Rose and Mather be the Committee to make the necessary arrangements for the dinner.

Annual Reports.

An outline of the several objects which have come under the notice of the Society during the past year, was submitted. The report of the Finance Committee and its appendices were likewise placed on the table. Both reports were transferred to the Committee of Papers for publication in the next number of the Journal.

Provision for Vegetable and Flower Seeds for 1850.

The following report was next read :—

" In accordance with the resolution of the last General Meeting,—that the members of the " Floricultural Committee," and of the " Garden Committee," report conjointly to the next General Meeting regarding the consignments of

vegetable and flower seeds for next season,"—Your Committee beg to state the mode in which they have endeavored to meet the wish of the Society, at their sitting held on the 5th January.

Vegetable Seeds from the United States.—The consignment of *flower* seeds received last year from Mr. Landreth, of Philadelphia, having caused much disappointment, scarcely one-half the varieties having germinated, and the assortment itself being by no means so varied as could be desired, your Committee recommend the withdrawal of the order on that head. This will leave a sum of about Rs. 730 available for other seeds, as hereafter detailed. The *vegetable* seeds from the same quarter, though not perhaps equal in quality to the supplies of former seasons, have proved, nevertheless, sufficiently satisfactory to induce your Committee to suggest that an indent be given for 400 packets, each packet to contain besides the 21 sorts sent last year, 8 additional kinds—in all 29 sorts. The cost for last season's supply of vegetable seeds is Rs. 1,100, to this your Committee propose adding 300 Rs. more, or say in all Rs. 1,400, to cover the cost of these additional varieties. A small supply of maize and cotton seed might also be indented for, as was done last year, at a cost not exceeding Rs. 180.

Cape Vegetable Seeds.—The vegetable seeds obtained last season from Messrs. Villet and Co., of the Cape, have not been so well reported on, as previous supplies, especially peas and beans. Your Committee not being however, at present, prepared to recommend a discontinuance of indent from that locality, beg to suggest that 400 packets be procured from Messrs. Villet. But with reference to the mode hitherto adopted by them, of not sending according to the list submitted for their guidance, and of substituting other and inferior sorts, your Committee propose that it be made imperative on Messrs. Villet, not only to adhere, as respects the next indent, closely to the order furnished, but also to forward a more varied assortment than they have been in the habit of doing, that is to say, to send in each packet 25 sorts—(as detailed in list marked B.)—instead of 19, as heretofore sent. In addition to these sorts, peas and beans to be also supplied of 8 or 10 sorts. Your Committee are further of opinion that, considering the large supplies ordered from Messrs. Villet, for several years past, this addition to the assortment should not cause an increase of more than 200 Rs., equivalent to Rs. 3-8 per packet, or Rs. 1,400 for the whole consignment.

English Flower Seeds.—As regards the consignment of English flower seeds received from Mr. Carter, of London, your Committee believe the general report to be satisfactory. They would therefore suggest that another order be given him. The consignment of last year, consisting of 400 packets, each containing 52 kinds, cost £110 (or equivalent to Rs. 1,200, at exchange of 1*s.* 10*d.* per rupee). This amount includes the expense of sub-dividing, printing labels, &c. The present order, your Committee think, should consist of the same number of packets, but they propose that each assortment

contain about 70 kinds, of which a list is given, and that an additional sum of Rs. 400 be allowed for that purpose, or Rs. 1,600 in all. Your Committee, not desiring to restrict Mr. Carter exactly to this list, would leave it to his discretion to withdraw such as may be too expensive, and substitute any other desirable, but less costly kinds.

Mr. Carter should also be requested to send a few fruit-stones, according to the list furnished in 1848.

The several indents will be as follows :—

From the United States, for vegetable seeds, as per list annexed marked (A.)	1,400	
From ditto, for maize and cotton seed, ...	180	
	——	1,580
From the Cape, for vegetable seeds, (B.)		1,400
From England, for flower seeds, (C.)		1,600
		4,580
Add for freight, insurance, &c., (according to last year's account)		380
		4,960

or say, Rs. 5,000, which is very nearly the amount expended for the consignments for 1849.

Your Committee have further to suggest, that Messrs. Lawson and Co., the eminent Seedsmen of Edinburgh, be applied to for a small trial assortment of vegetable seeds, say of some 30 kinds, to be despatched by the overland conveyance, so as to reach this in August or September next :—also to state particularly what their charges would be for supplying the Society with such English vegetable seeds, as it may annually require. Should this assortment prove satisfactory, it might be worth while to indent on them for a regular consignment, in lieu of the present Cape supply, provided the Society could obtain the seed FREE OF FREIGHT. To this latter point your Committee would, in conclusion, invite consideration, deeming it in every respect worthy the attention of the Society. They suggest, that a Sub-Committee of *this* Committee, communicate personally with Mr. Emerson, the Superintendent of the Peninsular and Oriental Company, and state, in detail, the wishes of the Society ; and that, in the event of the proposition meeting his concurrence, he be officially addressed by the Honorary Secretary, which letter could be retained for record, and for submission, should he deem it necessary, to the Home Management.

W. STORM.
W. G. ROSE.
W. EARLE.
H. FALCONER, M.D.

Proposed by Mr. Staunton, seconded by Mr. Mather, and *resolved*,—That the report be confirmed, and that the members whose signatures are attached thereto, form the Sub-Committee suggested in the last paragraph.

Communications on various subjects.

The following letters were also submitted :—

1. From the Commissioner of Arracan to the Secretary to the Government of Bengal, reporting the steps that have been taken for the introduction of Carolina paddy in that province.

2. From Major Jenkins, submitting a drawing of Parson's and Clyburn's patent seed-crushing machine, which has gained prizes from several English Agricultural Societies.

3. From the same, furnishing an account from a Cornish paper, descriptive of a machine for raising water, which he thinks worthy of enquiry on the part of the Society, as it might he highly valuable for agricultural purposes in India.

The above three letters were referred to the Committee of Papers : those from Major Jenkins were also referred to the Machinery Committee.

4. From Mr. H. Mansell, offering his services to the Society as regards models of agricultural machines, &c., if required to be sent to the proposed grand Exhibition of Arts to be held in London, in 1851.

In connection with the above letter, the following proposition was moved by Mr. Mather, seconded by Mr. Mornay, and agreed to—namely :—

"That a Committee be appointed to report to the next meeting on the propriety of the Society's sending specimens of native silk and woolen fabrics, of dyeing and tanning materials, of fibrous substances, of grain, &c. &c., as well as models of agricultural implements, &c., to the grand Exhibition of Arts and Manufactures intended to be held in London in 1851 : and that the following members be requested to form such Committee :—

"Dr. Falconer, Dr. McClelland, Messrs. Earle, H. Mornay, T. F. Henley, Arthur Adams, R. Frith, and J. H. Mather."

Mr. Mather further gave the following notice of motion for the next meeting :—

"That the Society incur such expence for sending to the grand Exhibition of Arts and Manufactures to be held in London in 1851, as may be recommended by the Special Committee appointed for that purpose."

5. From Lieut.-Col. Dixon, Superintendent of Mhairwarra, acknowledging the receipt of a quantity of *Carob* seed lately furnished to him by the Society. Col. Dixon is of opinion, that this supply is sufficient to admit of his extending plans for the introduction of this valuable tree in the districts under his charge.

6. From W. Seton Karr, Esq., Under-Secretary to the Government of Bengal, intimating that the Agent to the Governor General on the S. W.

Frontier, has received instructions to meet the application of Mr. Wheeler, preferred through the Society, for a reasonable quantity of coffee seed from the Government plantation at Chota Nagpore :—and further stating, that the plantation in question has not yet been given up by Government.

7. From Mr. C. Wheeler, tendering his acknowledgments to the Society for recommending his application for coffee seed, from the plantation at Chota Nagpore, to Government, and for the supply of safflower seed obtained for him from Dacca.

Before the meeting separated, it was proposed by Mr. Earle, seconded by Mr. Mather, and carried,—" That the best thanks of the Society are due, and are hereby given to the members of the "Bye-Laws' Committee," for the draft submitted by them."

It was further moved by Mr. Speede, seconded by Mr. Hugh Fraser, and carried,—" That the thanks of the Society be given to the Office-Bearers for their services during the past year."

(Thursday, the 14th February, 1850.)

William Storm, Esq., Vice-President, in the chair.

The unavoidable absence of the Honorary Secretary having been intimated to the meeting, the minutes of the Anniversary General Meeting were read. Previous to their confirmation, Dr. Falconer drew the attention of the members to the following addition that had been proposed and carried at that meeting, on the motion of Mr. Willis Earle, to the 7th Section of the 10th Chapter of the New Code of Bye-Laws ;—" their acts to be subject to the approval of the next General Meeting." This addition having been made without a month's previous notice being given, was equally contrary to the 16th article of the old Regulations of the Society, and the 18th Chapter of the New Code of Bye-Laws. He had no doubt the addition had been inadvertently proposed and carried. It was, nevertheless, very desirable, it should not form a precedent, and he therefore begged to move that that portion of the proceedings be not confirmed.

After some discussion, Dr. Falconer's proposition was put to the vote and carried.

In reference to the above, Mr. W. G. Rose gave the following notice of motion for the next meeting.

" That the following words be added to Section 7, Chapter 10 of the Bye-Laws of the Society ;—' their acts to be subject to the approval of the next General Meeting.' "

Election.

Baboo Buddinauth Bysack.

Proposals.

Francisco Pereira, Esq, Merchant, Calcutta,—proposed by Mr. R. F. Ross, seconded by Mr. J. G. Waller.

F. A. Killwick, Esq., Indigo Planter, Purneah,—proposed by Mr. W. Duff, seconded by Mr. H. Doveton.

E. A. Dow, Esq., Solicitor,—proposed by Dr. Huffnagle, seconded by the Honorary Secretary.

Baboo Sagore Dutt,—proposed by Baboo P. C. Mittra, seconded by Baboo Ramgopaul Ghose.

T. H. LeMaistro, Esq., Calcutta,—proposed by Mr. W. G. Rose, seconded by Mr. W. Storm.

Hodgson Pratt, Esq., C.S., Howrah,—proposed by the Honorary Secretary, seconded by Dr. Huffnagle.

Baboo Radhanauth Dutt, Calcutta,—proposed by Baboo P. C. Mittra, seconded by Baboo Sreekissen Sing.

Presentations.

1. Journal of the Royal Asiatic Society, Vol. XI. Part 1—and Vol. XII. Part 1. *Presented by the Society.*

2. Journal of the Eastern Archipelago for December, 1849. *Presented by the Editor.*

3. Two copies of the same work, for December, 1849. *Presented by the Government of Bengal.*

4. The New Indian Gardener, by G. T. F. Speede, (Vol. II.)—two copies. *Presented by the Author.*

5. Seeds of *Cedrus Deodara, Cupressus, Abies, &c.*, from the H. C. Botanic Garden, Saharunpore. *Presented by Dr. Jameson.*

6. A small assortment of English fruit and vegetable seeds. *Presented by J. R. Grey, Esq.*

The above seeds are available to members.

7. A quantity of cocoanuts (about 70) for planting, from Province Wellesley. *Presented by Joseph Agabeg, Esq.*

8. A muster of Moulmein *Loondy*, or shipping rice. *Presented by H. Fenwick, Esq.*

9. A sample of cotton raised at Ranchee, Chota Nagpôre, from acclimated Mexican seed. *Presented by T. M. Robinson, Esq.*

10. A *Churka* of the description in use in the Coimbatore district. *Presented by Dr. Wight.*

11. Specimens of ore, and of the metal extracted therefrom, found between Kherwarah and Oodypore. *Presented by Capt. J. C. Brooke.*

Plants of *Anemone*, in flower, from the Society's Garden, were placed on the table; also a few well-grown ears of maize of three kinds, raised from American seed, sown at the end of October.

Report of Special Committee regarding the contributions of Indian productions to the proposed Exhibition of Arts and Manufactures.

Read the following reports :—

Your Committee having met for the consideration of the matter referred to them at the last General Meeting of the Society had agreed to a report; (draft of which is herewith annexed) but having observed by the papers received by the last mail, that the Court of Directors were "prepared to give their cordial co-operation in carrying out the wishes of Prince Albert, by obtaining from India such specimens of the products and manufactures of that country as may tend to illustrate its resources, and add to the interest of the great National Exhibition, of which his Royal Highness is the Patron,"— are of opinion, that the matter has assumed a different shape from what it presented at the time of their appointment, and that it is requisite to refer the subject again to a general meeting of the Society.

2. Your Committee beg now to report, that they consider it desirable that a communication be opened with the Government for the purpose of ascertaining in what way the Society could assist in contributing Indian products for the proposed Exhibition.

ARTHUR R. ADAMS. | J. H. MATHER.
R. W. G. FRITH. | H. FALCONER, M. D.

Calcutta: 28th January, 1850.

[The following is the draft Report referred to above.]

The Committee appointed at the last general meeting, held on the 10th instant, to report on the expediency of the Society's sending specimens of manufactured articles, raw materials, implements, and models of machinery to the grand Exposition of the arts and manufactures to be held in London in 1851, having met and considered the subject referred to them, submit the following as their report :—

1. "Your Committee had not before them a prospectus defining the scope and objects of the proposed "Exposition," but from a report contained in one of the London daily papers, they understand that it is to be an "Exposition of the Industry of all Nations," as exhibited by raw materials, machinery, mechanical inventions, manufactures, sculptures, and the plastic arts generally.

2. Your Committee consider it highly expedient that the Society should move with vigour on the occasion, and arrange for transmitting to England, specimens of Indian products, as contributions to the proposed "Exposition." They conceive that it would be a reproach to the English community in this country, if Indian articles were omitted; and that it is incumbent on the Agri-Horticultural Society to take the lead in a case so closely connected with the avowed objects of its institution. They are further of opinion, that several of the products of Indian industry are of so superior a quality, as

to admit of competition with similar articles produced in any other country: and that the opportunity, if suitably followed up, may be made to subserve the objects of the Society, importantly.

3. Your Committee are not at present prepared to submit a list, or to define the articles and products, which they would recommend to be sent to the "Exposition:" the range and variety of these, would, in some measure, depend on the means available for the purpose: but they would now mention, the shawl-wool and shawls of Cashmeer, of the finest quality procurable by order: the silks and *kimkhabs* of Moorshedabad, Mooltan, and Burmah, besides the raw staples from Assam and the Shan, or other of the Indo-Chinese countries: the fine woolen rattoos of Rampore: the muslins of Dacca: the Mosaic jewellery and needle-worked shawls of Delhi: the gold and silver jewellery of Trichinopoly: the inlaid ivory work of the Malabar Coast: the black varnish and lacquered work of the Burmese provinces. It might be desirable, hereafter, to include models of Indian industrial machinery and implements; but in this case, your Committee would recommend a limited selection, and the exclusion of whatever articles might be considered as coming more properly under the head of ethnological specimens.

4. In order to provide sufficient funds to carry out the measure, your Committee would recommend, that the Society open a subscription among its members, and head the list with the sum of Rs. 1000; that a representation be submitted to Government, soliciting its aid, that the heads of the community, the leading influential Native gentlemen, and the public at large, be invited to join in the subscription. The Committee have every confidence, that an appeal in a case of such general interest, considering the grandeur and comprehensiveness of the proposed "Exhibition," would be liberally responded to, by all classes.

5. Your Committee would suggest, that the articles transmitted to the "Exposition" be sold in England, the proceeds to be applied to some useful purpose—connected with the objects of the Society,—to be hereafter determined.

6. The Committee would suggest, that the Honorary Secretary place himself in communication with Mr. Cole, the Provisional Secretary of the "Exposition" Committee in England, with a view to ascertaining what classes of articles it would be most desirable to send.

7. Your Committee recommend that, in case of the Society adopting the suggestions contained in this Report, a permanent Committee be appointed to carry the details of the requisite measures into execution.

8. No time ought to be lost in making the preliminary arrangements, as considerable delay must necessarily occur in procuring some of the contemplated articles."

Proposed by Mr. Staunton, seconded by Mr. Robert Watson, and *resolved*,—"That the thanks of the Society be given to the Special Com-

mittee for their Report, and that the recommendation contained therein be adopted."

In connection with the above, it was proposed by Mr. Arthur Adams, seconded by Mr. W. G. Rose, and *resolved :*—

"That the Committee appointed at the last general meeting be requested to continue their services, and that the following gentlemen be added :—Baboo Ramgopaul Ghose and Baboo Pearychand Mittra, with full powers to act ;—and that any letters from the Government of India on this subject be referred to the Committee."

A question having, at this stage of the proceedings, been put to the chair as to the interpretation of the last clause of Section IV. of Chapter XI. of the Bye-Laws, namely—"no special meeting shall take place without a month's previous notice being given, unless the case be urgent,"—*resolved,* "that it is the unanimous opinion of the meeting that the estimate of the question of urgency rests with the Requisitionists, and not with the Officers of the Society."

Horticultural Exhibition.

A list of native gardeners, to whom prizes were awarded at the show of vegetables and fruits, held in the Town Hall, on the 2d February, was submitted, together with the following report of the judges :—

In submitting the annexed list of prizes awarded at the Horticultural Exhibition, held on the 2d February, the judges desire to offer the following remarks :—

First.—As regards the "foreign vegetables," it may be noted, that the cauliflowers, which numerically exceeded all the other kinds of vegetables, were exceedingly well-grown, nearly all being equally good, with firm compact heads. Of cabbages, the variety was not, perhaps, equal to that of last year, but there were several excellent samples of the finer kinds, such as "sugar-loaf," "Savoy," and "early York," and the red cabbages were superior to any that have yet been submitted. There were a few baskets of brocoli which, though tolerably fair, require much more care and attention to bring them to perfection. The same remark is applicable to the Scotch kale. It being considered doubtful by some whether this vegetable can be brought to any degree of perfection in Bengal, in consequence of the absence of frost during the period of growth, it may be proper to remark in this place, that one of the judges (Mr. Speede) states, that he has grown it in great perfection at Allipore and Kidderpore, and that the stock stands for 3 or 4 years, supplying greens all the year round. The endives were well-blanched, the lettuces, both coss and cabbage, an improvement on those of previous years. Of peas there was a tolerably fair show. The celery both in quantity and quality, showed a decided improvement, and it is to be hoped, that the continued encouragement accorded to the producers of the best samples will induce the *mallees,* in the course of a few more years, to bring this fine

esculent to the same degree of perfection as most of the other foreign vegetables. The samples of beet were good, especially the "long-blood" sort. Carrot, nole-kole and turnips were fairly represented; for a basket of the last named (American flat turnip) a medal, and the only medal, was awarded. These superior marks of encouragement were also held out to the producers of the best specimens of potato and Windsor beans; but those submitted were not considered deserving of such reward; indeed, of the latter there was only one sample, and that by no means a good one; the owner of it was, nevertheless, thought worthy of a reward of six rupees, to encourage the culture of a variety of bean which is seldom brought to market. Two well-grown specimens of American squash were exhibited, and another of horse-raddish. Of Brussels' sprouts, asparagus, and that fine sort of bean, the "Lima," there were no specimens; the amount offered for them was therefore given for artichoke and cardoons (both very early in the season), and tomato, which were not included in the list of prizes.

Of the Native vegetables and fruits, the judges have only to mention that among the former was a very well-grown batch of maize for the season, raised from foreign (probably American) seed; and among the latter, a few baskets of very fair oranges, the produce of Calcutta and the suburbs. In regard to this last-named fruit, the judges beg in conclusion to submit a recommendation from one of their members (Mr. Speede), whose memo. is annexed to this report, and to suggest that steps be taken to endeavor to carry it into effect, the more so, as it might be affected at a very trifling cost to the Society.

[Mr. Speede recommends the Society to obtain young orange trees from Ceylon, and to make enquiries respecting a tree of Mozambique origin, in the garden of Mr. Blacquiere, near Calcutta, (a specimen of the fruit from which was presented to the Society so far back as 1829,) and any other that may have been raised from it.]

The amount detailed in the annexed list, namely, Rs. 258, and a silver medal, was awarded to the successful competitors by William Storm, Esq., Vice-President. Altogether, this show may be pronounced as about the best that has been held under the auspices of the Society.

G. T. F. Speede.
W. Earle.
Pearychand Mittra.

The suggestion of the Committee was agreed to.

Read a letter from the Hon'ble Mr. Bethune, declining to act as a member of the Committee of Papers. Mr. Bethune adds,—" I decline to accept any office in the Society while political opinions are made a test of qualification for the duties of its Office-bearers, which I understand to have been avowed at the last meeting of the Society."

Read a letter from Cecil Beadon, Esq., intimating that he understands from a paragraph in one of the newspapers, that Baboo Ramgopaul Ghose

was not re-elected to the office of a Vice-President of the Society in consequence of his supposed opinions with respect to a political question now under the consideration of Government. "The number of those who voted against Ramgopaul Ghose," observes Mr. Beadon, "is no doubt small, but unless some means can be taken of publicly expressing the Society's disapproval of the course followed on this occasion, and of removing the slur which has been cast upon Baboo R. G. Ghose, I beg to intimate my intention of withdrawing my name from the list of subscribers."

Read a letter from C. Allen, Esq., C. S., requesting that his name be withdrawn from the list of members, as he declines "to belong to a Society the members of which allow reasons unconnected with its welfare to influence their votes. I need not say that I refer to the non-re-election of Baboo Ramgopaul Ghose, as a Vice-President, at the last meeting."

Read a letter from Rajah Pertaub Chunder Sing, and eleven other native gentlemen, members of the Society, desiring to record their protest on the same subject, "being anxious that the interest and credit of the Society should be preserved."

With reference to the above communications, the following Resolution, proposed by Dr. Falconer and seconded by Baboo Pearychand Mittra, was carried *unanimously* :—

"*Resolved,*—That there is no evidence on the record of the proceedings to countenance the belief that political motives influenced the Society in the election of the Vice-Presidents at the late Anniversary Meeting; and that this meeting repudiates the imputation *in toto.*"

Communications on various subjects.

The following letters were also submitted :—

1. From Rajah Pertaub Chunder Sing and Baboo Ramanauth Tagore, accepting of the office of Vice-Presidents of the Society, and returning their acknowledgments for the honor conferred on them.

2. From M. S Staunton, Esq., declining to accept of the office of a member of the Committee of Papers on the ground of his imperfect acquaintance with the several subjects usually referred for the consideration of that Committee.

It was agreed to defer the filling up of this vacancy till the next general meeting.

3. From Geo. Plowden, Esq., Secretary Sudder Board of Revenue, transmitting copy of a letter from the Commissioner of Cuttack, and requesting to be informed if the Society can assist the Commissioner with a few models of a superior kind of plough, for distribution in that district.

It was agreed to transfer a model of a light and cheap American plough, it being considered more likely to answer the purpose required than any of the other kinds in the Society's Museum.

4. From Capt. J. C. Brooke, forwarding the specimens of ore and metal alluded to among the presentations, and requesting to be furnished with an analysis of them, and information as to the composition of the metal, and the best method of smelting the ore. Capt. Brooke furnishes some interesting particulars regarding the place where this ore is found, and the methods of working the mines, as adopted in former times.

It was agreed to refer these specimens to Dr. Dodd, and to request the favor of his giving the desired information.

5. From A. Emerson, Esq., promising to attend to the Society's requests —first, in seconding its application to the Managers of the Peninsular and Oriental Company, for free freight per steamer of its annual consignments of seeds from England; and secondly, in procuring *Camellia* plants from China, and cocoanuts from Ceylon.

The special thanks of the Society were given to Mr. Emerson for his valuable offer of co-operation.

6. From Dr. Wight, Supt. Government Cotton Farms, Coimbatore, furnishing replies to certain queries regarding the cost, &c., of separating cotton-wool from the seed in his district. Referred to the Committee of Papers.

7. From G. T. F. Speede, Esq., presenting two copies of the second volume of his "New Indian Gardener."

The thanks of the Society were accorded to Mr. Speede: it was also agreed, that the Society subscribe for four copies of the work.

8. From J. M. Blount, Esq., Superintendent Government Cotton Experiments, Dharwar, intimating his intention of forwarding a cotton saw-gin to compete for the prize of 5,000 Rs. offered by the Government of India, through the Society. "This saw-gin," Mr. Blount mentions—"is a small machine of 7 saws, modified to suit the wants of the ryots, and constructed for cleaning Native cotton, and made by Mr. H. Frost, the Engineer attached to this establishment. Several of them have been in operation during the past year, in different parts of this district, worked by Natives, and it cleans with two men and a boy, per diem of 10 hours' work, 336 to 400 pounds of *kuppas*, or 84 to 100 pounds of *rooee*. These gins are made up at the Government gin-shop, in the village of Koosighul, by Native workmen, and sold to the Natives at Rs. 40 each."

9. From W. B. O'Shaughnessy, Esq., Secretary to the Asiatic Society of Bengal, requesting, on behalf of the Council, to be supplied with a few copies of the Rules recently adopted by this Society. Complied with.

10. From R. H. Clarke, Esq., Secretary to the Royal Asiatic Society of Great Britain, conveying the thanks of the Society for a copy of Vol. 6, part 3, of the Journal of the Agri-Horticultural Society of India.

Flower Show.

Before the members separated, it was announced that the Town Major had kindly offered the use of the Auckland Circus, and the loan of several

tents for the flower show on the 27th instant; and that Lieut. Col. Galloway had also very politely promised the attendance of the Band of H. M.'s 70th Regiment on that occasion; whereupon it was unanimously agreed, that the Exhibition be held in the Circus instead of in the Town Hall.

(Thursday, the 14th March, 1850.)

William Storm, Esq., Vice-President, in the chair.

The minutes of the last general meeting were read and confirmed.

With reference to a Resolution past at the last general meeting, declaring that the question of urgency as regards the calling of *special* meetings was for the requisitionists and not the Officers of the Society,—which the Hon. Mr. Bethune and the Honorary Secretary thought an erroneous decision,—some discussion took place as to the real meaning of the term "confirmed" —whether it was intended thereby to record an approval of the proceedings or simply to affirm the fidelity of the minutes as recorded.

The Honorary Secretary gave notice of motion that the Resolution referred to should be re-considered at the next general meeting, and the Hon'ble Mr. Bethune intimated, that he would give notice of motion (see post) for altering the expression "read and confirmed," as there appeared a difference of opinion on the subject.

Elections.

Messrs. F. Pereira; F. A. Killwick; E. A. Dow; T. H. LeMaistre; Hodgson Pratt; Baboos Sagore Dutt, and Radhanauth Dutt.

Proposals.

William Greenaway, Esq., Merchant,—proposed by Mr. W. Earle, seconded by Mr. Joseph Willis.

Charles H. West, Esq., Merchant,—proposed by Mr. A. Wallace, seconded by Mr. W. G. Rose.

Lieut. W. R. E. Alexander, Adjt., Ramghur Light Infantry,—proposed by Capt. G. C. Armstrong, seconded by the Hony. Secy.

Presentations.

1. Journal of the Indian Archipelago for January 1850. *Presented by the Editor.*

2. Two copies of the same work, for the same month. *Presented by the Government of Bengal.*

3. Journal of the Asiatic Society of Bengal, for September 1849. *Presented by the Society.*

4. The Implements of Agriculture, by J. Allen Ransome. *Presented by the Author.*

5. Roxburgh's Observations on substitutes for Hemp and Flax. *Presented by Dr. Falconer.*

Read the following letter from the Hon'ble the President, to the address of the Honorary Secretary :—

SIR,—I regret my inability to attend the monthly meeting of the Agricultural and Horticultural Society fixed for to-morrow. If I were well enough, I should certainly attend and state there what I must now write. I have learnt with regret but not surprize, of some resignations, and I hear that to-morrow more will be announced. I think that these resignations are not called for by any act of the Society ; but I admit the right of any member to secede when he pleases from our Society. I shall assume that the cause assigned for the non-re-election of a late Vice-President, is the true cause ; I regret to say that I think the cause is truly assigned : though my information is merely hearsay, subsequent to the election. Still the error of the proceeding is in no way ascribable to the Society. When, as is too often the case in Societies in England, formed for social or scientific purposes, a candidate is excluded, because a private enemy lurks in the Society : or the proposer is on public ground obnoxious to individuals, the common sense as well as the justice of mankind discriminates between the acts of the Society, and of individuals belonging to it. Why should it be otherwise here ? The character of our Society is to be derived from its general history. But it has not, it is said, vindicated itself sufficiently from the imputation, which the act of one or the acts of a very few voters have cast on it of being a political Society. What could it have done ? An election is not rescindible like a mere resolution. The preferred candidate has his rights : and when the votes are taken and the numbers declared, the preferred candidate cannot be postponed on motives of policy to his rival competitors, neither can any scrutiny into the mere motives of a vote be taken. In general it would be merely abortive in its result. The Society has no power to institute such a scrutiny. It would be an intolerable inquisition : and would cause infinite divisions and evil. Can the Society even be censured because it did not frame a resolution on an assumption in default of evidence ? I think not. It declared there was no evidence, there could not properly be any in such a case of the motives of particular electors. It might have declared the duty of an elector in this Society : and certainly nothing can be more detrimental to the interests of this Society and more repugnant to the duty of an elector in it than to make his preference of one candidate to another turn on politics. In the state of feeling of some of the members of the Society, this declaration might have had a calming effect ; and for this reason, I wish that it had been made. I was myself unfortunately

absent at the last meeting. The Resolution, however, does repudiate the imputation upon the Society of a political bias : and therefore impliedly at least reads the desired lesson to individual members, because the imputation of bias was founded in those votes, and the motives ascribed to them.

The disruption of all such Societies would seem to be inevitable, if men were not found more tolerant of each other's opinions or even errors, whether of judgment or of conduct, than they have proved to be in this unfortunate case. I have, &c.,

Garden Reach: March 13, 1850. LAWRENCE PEEL.

Read a letter from the Hon'ble Mr. Bethune, acknowledging the receipt of the Resolution passed at the last general meeting, to the effect that there was no evidence on the record of the proceedings to countenance the belief that political motives influenced the Society in the election of the Vice-Presidents at the late Anniversary Meeting,—and intimating, with reference thereto, and to the distinct disavowal and repudiation on the part of the Society of the idea of political considerations being allowed to influence the votes of members, his readiness to resume his place as a member of the Committee of Papers.

Read a letter from Cecil Beadon, Esq., intimating his withdrawal from the Society, the Resolution passed at the last meeting not being, in his opinion, satisfactory.

Read a letter of resignation from Baboo Issur Chunder Ghosaul, to the same effect.

The Honorary Secretary submitted the following Resolution :—

"That with reference to the letters just read, this meeting expresses its regret, the former Resolution was not as satisfactory to the members as it is thought it might have been. This meeting desires to record its opinion, in the most explicit terms, that nothing can be more detrimental to the interests of this Society, and more repugnant to the duty of a member than to make the preference of one candidate to another turn on political considerations."

Sir James Colvile, Dr. Falconer, and the Hon'ble Mr. Bethune, spoke on the subject of the above motion ; and the latter gentleman gave the following as a notice for next meeting :—

"That as it appears to this meeting that several members of the Society have expressed their belief that a recent election was decided on political motives, and intimated their intention on that account of withdrawing from the Society, this meeting desires to record its opinion in the most explicit terms, that nothing can be more detrimental to the interests of this Society than to make the election of any of its Office-bearers depend on political considerations."

Bye-Laws.

The motion of which notice was given at the last meeting by Mr. W. G Rose :—"That the following words be added to Section 7, Chapter X. of the

Bye-Laws of the Society,—' their acts to be subject to the approval of the next General Meeting,'" was next brought forward, supported by the Mover, seconded by Mr. Earle, and *negatived.*

The following notices were then submitted :—

Moved by the Hon'ble Mr. Bethune.—1. "For alteration of the first paragraph of Section 3, Chapter XI. of the Bye-Laws, [" The proceedings of the preceding General Meeting shall be read and submitted for confirmation,"] in order to declare that the minutes of proceedings of one meeting are to be read at the next meeting, not for confirmation, but in order to ascertain that they are correctly recorded."

2. "For amending Section 6 of the same chapter by introducing after the words—" all questions"—the words—" of finance, and others which appear of sufficient importance to the meetings"—which are to be."

Moved by Mr. A. R. Adams.—"That Section 7, of Chapter X. in the Code of Bye-Laws, be struck out."

Moved by Dr. Falconer.—1. "That Chapter X. of the Draft of the Code of Bye-Laws, as framed by the Bye-Law Committee, be adopted, with all its provisions, in substitution of Chapter X. as it now stands ; and that corresponding alterations be made in the preceding and subsequent chapters wherever the functions of the Council are concerned."

2. "That the word "Saturday" be substituted for the word "Thursday" in Section 1, of Chapter XI. of the Bye-Laws, as the most advantageous for transacting the business of the Society."

Proposed by Baboo Pearychand Mittra, seconded by Baboo Radhanauth Sikdar, and *resolved :*—

"That a *Special* Meeting be convened on Saturday, the 30th of March, at 10 A.M., for the purpose of taking into consideration the different motions relative to the Bye-Laws, of which notices have been given."

It was further agreed, that Chapter X. of the *Draft* Code of Bye-Laws, and Chapter X. of the Code, as passed at the *Special* Meeting on the 28th December last, be reprinted and circulated for the information of resident members, previous to the *Special* Meeting to be held on the 30th March.

Nursery Garden.

Read a report from the Garden Committee. The Committee state, that the Garden is in good order, and that the improvements and repairs directed in their last report have been completed. The Committee report, that of the many applicants for the vacant situation of Head Gardener, so few profess to have any knowledge of practical gardening—and the experience of those few being confined to floriculture,—that they deem it would be desirable to delay the appointment of a successor to the late Mr. D'Cruz for the present, and recommend that an advertisement on the subject (according to a form annexed to their report) be inserted in the Mofussil and local news-

papers. The Committee add, that "they cannot conclude their report without the expression of their regret at the sudden death of Mr. D'Cruz, whereby the Society has been deprived of the services of a zealous, faithful and intelligent servant of twelve years' standing."

Read a memorial from the widow of the late Head Gardener, stating that in consequence of the death of her husband she and her infant children have been left in a destitute condition, and soliciting the aid of the Society.

With reference to the above report, Dr. Falconer adverted to the importance of the vacancy being filled up by a competent European Gardener, and stated, that he had been authorized by Sir Lawrence Peel to intimate that he was so strongly of this opinion, that he would undertake to pay, annually, half of the salary, for a period of three years, in order to aid the Society in effecting so desirable an object.

Proposed by the Hon'ble Mr. Bethune, seconded by Dr. Falconer, and *resolved,*—"That this meeting receives the liberal proposal of Sir Lawrence Peel, as one more proof of the zeal and munificence by which he has so greatly advanced the science of horticulture in India, and the interests of this Society: but that they are of opinion, that the Society cannot, with propriety, accept a contribution in this form from an individual member for defraying the salaries of the servants necessary for the purpose of its institution, while their own funds are sufficient for bearing the expence."

Proposed by Dr. Falconer, seconded by Baboo Pearychand Mittra, and *resolved,*—"That with reference to the above communication from Sir L. Peel, regarding the expediency of filling up the vacancy caused by the death of Mr. D'Cruz, by a qualified European Gardener, the Report of the Garden Committee be remanded to them for re-consideration, and for submission to the next ordinary meeting: and further, that the memorial from Mrs. D'Cruz, be handed over to the Committee, for report at the same time."

Floricultural Exhibition.

A list of prizes, amounting to Rs. 250, which were awarded at the flower show, held in the Auckland Circus, on the 27th of February, was next submitted, with the following remarks of the judges:—

In submitting the annexed list of prizes awarded at the first quarterly flower show, held on the 27th of February, the judges desire to offer the following remarks on some of the plants submitted, and on the general arrangements:—

Imprimis.—It may be observed, that of all the plants brought forward on this occasion, the *Phloxes*, *Verbenas*, *Portulacas* and pinks, numerically exceeded the others. Among the *Verbenas* were several varieties, some of them well-grown specimens; and of *Portulacas*, the white, yellow, crimson, scarlet and striped sorts were shown. The collection of heart's-ease and violets were also rather large; and the flowers of the former, to which prizes

were awarded, tolerably perfect, but among the others there was room for improvement. Several well-grown plants of *Begonias*, and *Oxalis* of the more common sorts, were exhibited, with a few specimens of *Euphorbia jacquiniflora* in full flower. The collection of annuals was varied; prizes were awarded to about twenty-five kinds. The climbers were pretty well represented, consisting of *Buginvillæa spectabilis, Poivrea coccinea, Banisterea laurifolia, Petrea Stapeliæ, Maurandyas* of two varieties, &c. The bulbous tribe and orchids had also several representatives; among the former were some exceedingly fine specimens of *Lilium Japonicum*, a few *Irises*, a hyacinth, *Anemones* and *Ranunculuses*. The three latter, with a fine *Fuchsia*, may be classed as novelties.

The competition was greater than at any previous show. Specimens were sent in from upwards of forty gardens, to thirty-two of which, the prizes, detailed in the schedule, were awarded.

The judges are of opinion, that this first attempt at holding a show in the open air, under tents, has proved sufficiently successful to warrant a continuance of it, whenever the state of the season will permit. They would take this opportunity to acknowledge their obligations to Mr. J. H. Mather, a member of the Society, for the trouble he took in the arrangement of the tents and other details connected with the Exhibition; also to Mr. G. Bartlett, for aiding in the arrangement of the plants on the morning of the show.

They would further desire to express their acknowledgments to Col. Warren, Town Major, and Captain Fraser, Civil Architect, for their obliging acquiescence in all the wishes of the Society, in the loan of tents and tables, and for the use of the ground in the Auckland Circus, on which the show was held.

Edward Madden, *Major.* | N. A. Staples, *Captain.*
H. Falconer, M.D. | A. Grote.

It was agreed, that it be referred to the Floricultural Committee, and Fruit and Kitchen Garden Committee, conjointly, to ascertain whether the next shows of flowers, fruits and vegetables can be held simultaneously, and in the Auckland Circus.

London Exhibition of Arts and Manufactures in 1851.

Read the following letter from the Officiating Secretary to the Government of India, in the Home Department, to the address of the Hony. Secy. of the Society:—

Sir,—Your letter of the 19th ultimo and its enclosure, having been laid before the President in Council, I am directed to convey the cordial acknowledgments of the Supreme Government for the promptitude with which the assistance of the Agricultural Society has been offered, for the purpose of procuring a collection of the products of India for transmission to the grand Exhibition which it is proposed shall be held in London in 1851.

2. In a *Gazette* issued this-day, a Despatch on the subject from the Court of Directors is published for general information, and it is notified, that the Government of India has communicated with the several local Governments regarding the measures which it seems desirable to adopt in order to carry out the wishes which are intimated by the Court in that Despatch, regarding the transmission to the Exhibition of a valuable collection of the products and manufactures of India. The general plan which has been suggested to the local Governments is the establishment of a Central Committee at the seat of each Government, and of subordinate committees in different parts of each Presidency. The appointment of a Central Committee in Calcutta will doubtless, therefore, be shortly notified, and the President in Council is satisfied that the labors of the Committee may be much facilitated, as regards at least one branch of the collection to be made, by the valuable assistance which the Agricultural Society has the means of affording.

I have, &c.,

Council Chamber: Wm. Grey,
The 1st March, 1850. *Offg. Secy. to the Govt. of India.*

Communications on various subjects.

The following communications were also submitted :—

1. From the Rev. James Long, requesting to be supplied with copies of the Society's "Transactions" in Bengallee (vols. 1 and 2), for certain libraries which he is forming in the Mofussil. Agreed to.

2. From Baboo Cossinauth Chowdry, suggesting that the "Proceedings," and all publications of the Society, be printed in the native languages.

Proposed by Baboo Peary Chand Mittra, and agreed,—"that the letter of Baboo Cossinauth Chowdry be referred to a Committee consisting of Rajah Pertaub Chunder Sing, Baboos Ramgopaul Ghose and Radhanauth Sikdar, for their report on the subject." The name of the mover was also added to the Committee.

3. From Messrs. Ransome and May, Engineers and Ironfounders, Ipswich, forwarding a few copies of their illustrated catalogue, and a copy of an octavo volume on implements generally.

4. From Major Jenkins, submitting a drawing and notice of Remington and Whitton's improved horse-mills for grinding wheat, which he is of opinion, might be advantageously introduced in the N. W. Provinces.

5. From the Librarian Calcutta Public Library, transmitting a notice regarding the assessment of the Metcalfe Hall. Referred to the House Committee.

6. From Dr. James Dodd, reporting on the geological specimens received from Capt. Brooke of Khewara.

It was agreed to transfer Capt. Brooke's communication, the above report, and specimens, to the Asiatic Society, for its Museum of Economic Geology.

The names of Dr. M'Clelland and Mr. A. Grote were added to the Committee of Papers to fill two vacancies in that Committee.

A fine plant of *Fuchsia*, in full blossom, and a very healthy plant of *Dahlia*, with well-formed flowers, both raised in Mrs. McLeod's garden, from seed received from Simla, were placed on the table : also six fine varieties of *Ranunculus* in flower, from the Society's garden.

A specification of the different kinds of American fruit trees, just imported by Mr. Ladd per *Epaminondas*, was likewise submitted to the meeting, and referred to the Garden Committee.

(Saturday, the 30th March, 1850.)

Special Meeting.

The Hon'ble Sir Lawrence Peel, President, in the chair.

The Hon'ble the President having intimated, that this *Special* Meeting had been convened for the purpose of taking into consideration the different motions relative to the Bye-Laws, of which detailed notice had been given at the last General Meeting, the Members proceeded to business, taking the motions according to the order in which the notices were given.

1st. The Hon'ble Mr. Bethune's motion.—"For alteration of the first paragraph of Section 3, Chapter XI. of the Bye-Laws, in order to declare that the minutes of proceedings of one meeting are to be read at the next meeting, not for confirmation, but in order to ascertain that they are correctly recorded."

In the absence of the Mover, Mr. Earle proposed, and the Honorary Secretary seconded the above motion, which was put to the vote, and *negatived*.

2nd. The Hon'ble Mr. Bethune's motion.—"For amending Section 6 of the same Chapter, by introducing after the words—"all questions"—the words—"of finance, and others which appear of sufficient importance to the meetings" which are to be."

Moved by Mr. Arthur Adams, (in the absence of the original Mover) seconded by Mr. Staunton.

Dr. Falconer moved, and the Honorary Secretary seconded the following as an amendment to the above, and in substitution of Section 6, Chapter XI. of the present Code :—

"Notice of motion on questions of finance, or other matters of importance, shall be given at a General Meeting preceding that on which the subject is to be disposed of ; and no motion of which notice has not been given shall be carried at the meeting at which it is proposed, if any three members present vote for its postponement."

The amendment was put to the vote, and carried unanimously.

3rd. Mr. A. R. Adam's motion.—"That Section 7, of Chapter X. in the Code of Bye-Laws, be struck out."

Seconded by Mr. W. G. Rose.

4th. Dr. Falconer's motion.—"That Chapter X. of the draft of the Code of Bye-Laws, as framed by the Bye-Law Committee, be adopted, with all its provisions, in substitution of Chapter X. as it now stands; and that corresponding alterations be made in the preceding and subsequent chapters wherever the functions of the Council are concerned."

With the consent of Mr. Adams, Dr. Falconer's motion, which was seconded by Col. Sage, being allowed to stand as an amendment to his (Mr. Adam's) was put to the vote, and *carried,* with the addition of the words,—"including the adoption of Chapter XII."

5th. Dr. Falconer's motion.—"That the word "Saturday" be substituted for the word "Thursday," in Section 1, of Chapter XI. of the Bye-Laws, as the most advantageous for transacting the business of the Society."

The above, being seconded by Baboo Peary Chand Mittra, was put to the vote, and *carried unanimously.*

(Saturday, the 13th April, 1850.)

William Storm, Esq., Vice-President, in the chair.

The proceedings of the last General Meeting, and of the *Special* Meeting held on the 30th March, were read and confirmed.

The motion of which notice was given by the Honorary Secretary at the last General Meeting,—"That with reference to the letters just read, this meeting expresses its regret, the former resolution was not as satisfactory to the members as it is thought it might have been; and this meeting desires to record its opinion, in the most explicit terms, that nothing can be more detrimental to the interests of this Society, and more repugnant to the duty of a member than to make the preference of one candidate to another turn on political considerations:"—was brought forward, and—after considerable discussion,—was withdrawn by the Mover.

A motion, of similar effect, of which notice was given by the Hon'ble Mr. Bethune at the last general meeting, was not brought forward in consequence of the absence of the Mover.

Notice of Motions.

Dr. Falconer gave the following, as a notice of motion for the next General Meeting:—

"That the words, 'in order that members who take an interest in the question, may have an opportunity of expressing their assent or dissent,' be inserted after the words, 'to be disposed of' in the section which was passed

at the late *Special* Meeting, in substitution of Section 6, Chapter XI. of the Code of Bye-Laws."

Col. Sage gave the following as a notice for the next General Meeting :—

"That with the exception of the President, Secretaries and Treasurer, the Office-bearers of this Society shall not be eligible for re-election, until twelve months after the expiration of their tenure of office."

Elections.

Messrs. Wm. Greenaway, Charles H. West, and Lieut. W. R. E. Alexander.

Proposals.

Baboo Maudhub Chunder Sen, Kezanchee of the Bank of Bengal,—proposed by Baboo Peary Chand Mittra, seconded by Baboo Ramgopaul Ghose.

Dr. H. Chapman, Presidency Surgeon,—proposed by Dr. Huffnagle, seconded by Sir L. Peel.

James Forlong, Esq.,—proposed by the Honorary Secretary, seconded by Dr. Huffnagle.

Presentations.

1. Madras Journal of Literature and Science, No. 36. *Presented by the Madras Literary Society.*

2. Journal of the Eastern Archipelago for Feb. and March, 1850. *Presented by the Editor.*

3. Two copies of the same work for the same months. *Presented by the Government of Bengal.*

4. A box of grape-vine cuttings from the Cape. *Presented by Dr. Strong.*

These have, unfortunately, all arrived in a decayed state.

5. A collection of orchideous plants from Assam. *Presented by Major Jenkins.*

6. Specimens of the raw silk and cacoon of the mulberry worm, from Arracan. *Presented by Capt. Phayre.*

7. Seeds of *Dryandra ovata*, and of *Stillingia sebifera*. *Presented by Dr. Falconer.*

Dr. Falconer mentions, that these seeds have been lately received from Mr. Fortune from China. The first named seed yields the *Tung* oil of the Chinese, used by carpenters : the other is considerably larger than what is yielded by the trees now common in Bengal.

A report was read from the Garden Committee on certain subjects referred at the last general meeting for their consideration. The Committee are of opinion, that it would be very desirable to engage the services of an educated and practical European Gardener for the Garden :—but that it would be more advisable, as recommended in their former report, to

endeavor to obtain the services of such a man on the spot;—and that failing in this, and as a last resource, a Gardener might be procured from England. The Committee recommend, in reference to the memorial of Mrs. D'Cruz, that the sum of Rs. 30, being one-half of the official monthly salary of her late husband, be paid to her monthly by the Society, for a period of two years, from the date of his death.

The Committee further report the purchase of a lot of American fruit trees, from the batch received by Mr. Ladd of the Ice House: that they are in excellent condition, and are being carefully treated previous to planting out during the next cold season.

Resolved,—That the report of the Committee be received, but the consideration of the subjects noted therein deferred till the next general meeting.

A list of Resolutions passed by a Conjoint Committee of the Floricultural Committee, and of the Fruit and Kitchen Garden Committee, regarding the arrangements for the next show of flowers, vegetables and fruits was submitted, and agreed to.

Communications on various subjects.

The following letters were also read :—

1. From H. V. Bayley, Esq., Under-Secretary Government of Bengal, submitting copy of a report from Mr. Price, Superintendent of the Dacca Cotton Farm, on the working of the Cottage saw-gin received from England in November last.

2. From Captain Phayre, Commissioner of Arracan, forwarding an extract of a letter to his address from Lieutenant Fytche, Principal Assistant Commissioner at Sandoway; which gives, in reply to the queries of the Society, some interesting particulars relative to the silk-worm and silk of that district, and its introduction into the Province of Arracan.

The above communications were referred to the Committee of Papers.

3. From the Rev. James Long, returning thanks for the donation of Vernacular books presented at the last general meeting for the Vernacular Libraries; and requesting to be furnished with two sets of the Society's Transactions for the Central Libraries at Kishnaghur and Calcutta. Agreed to.

4. From Major Jenkins, suggesting the importation, for general distribution, of seeds of indigenous Cape and N. S. Wales plants. Referred to the Garden Committee.

5. From C. Gubbins, Esq., Meerut, applying for seeds of pimento and coffee; suggests the attempt at introduction of the cork oak in the Himalaya.

The above note was referred for opinion to Dr. Falconer, who considers the *Quercus suber* (cork oak) worthy of a trial in the Hills of the N. W. P. and Deyrah Dhoon. All the pimento trees in the Botanic Garden, Dr. Falconer observes, that bore fruit, were cut down during the thinnings of 1843-44; but as many young plants were introduced during his time into

the Saharunpore Botanic Garden, it has been suggested to Mr. Gubbins to apply for some plants from that establishment. It was further agreed, as the acorns do not keep fresh long, to apply to Mr. Emerson to endeavor to obtain a supply of those of the cork oak through the Peninsular and Oriental Company's Agent at Gibraltar.

6. From J. O. Price, Esq., Dacca, advising despatch of cotton plants of different kinds, soils in which they have been grown, &c., as requested by the Society, to meet an application from Dr. Mayer, of the Madras Medical Establishment, who requires them for the purpose of analysis, for Professor Royle.

7. From Messrs. Grindlay and Co., dated London, 25th February, acknowledging a remittance of £30, and promising their best attention to the Society's request in regard to advertising in the leading journals of Great Britain and the Continent, the offer, by the Government of India, through the Society, of a prize of Rs. 5,000, to the producer of the best machine for separating cotton-wool from the seed.

The Secretary informed the meeting, that he had received from Mr. Mather 5 cwt. of Banda seed-cotton which, in accordance with the resolution of the general meeting of December last, that gentleman had had properly cleaned and packed for the Society, and that the same had been shipped per *Ormelie*, to Messrs. Grindlay and Co., to enable them to meet applications for samples from intending competitors in England for the prize above referred to.

Applications were submitted from Messrs. James Landon, at Broach; R. H. Keatinge, at Mundlaisir; T. J. Edwards, at Malligaum; and J. J. Waterston, at Bombay, for copies of the conditions of award of the prize above alluded to.

Before the meeting separated, it was proposed by Dr. Falconer, seconded by Colonel Sage, and *resolved*,—"that a *Special* Meeting of the Society be held on Saturday fortnight, the 27th April, at 9½ A.M. for the election of the Council, as carried by the resolution adopted at the *Special* Meeting, held on the 30th March."

(Saturday, the 27th April, 1850.)

Special Meeting.

A *Special* Meeting was held on Saturday, the 27th April, 1850.

Baboo Ramanauth Tagore, Vice-President, in the chair.

The Chairman intimated, that this Meeting was held in pursuance of the following resolution passed at the last General Meeting of the Society on the 13th instant, viz:—

"That a *Special* Meeting of the Society be held on Saturday fortnight, the 27th April, at 9½ A.M. for the election of the Council, as carried by the resolution adopted at the *Special* Meeting held on the 30th March."

A ballot was then held, and Messrs. W. G. Rose and Hugh Fraser having been appointed Scrutineers by the Chairman, reported that the following gentlemen had been elected Members of the Council of the Society :—

The Hon'ble J. E. D. Bethune, Lieut. Col. W. Sage, Messrs. A. Grote, M. S. Staunton, Alfred Turner, W. G. Rose, H. Alexander, J. H. Mather, and John McClelland, Dr. Falconer, Baboos Ramgopaul Ghose and Pearychand Mittra.

It was considered by the meeting unnecessary, in the event of any of the gentleman elected not being willing to accept the office, that such vacancy or vacancies should be filled up until the next Anniversary General Meeting.

(Saturday, the 11th of May, 1850.)

William Storm, Esq., Vice-President, in the chair.

The proceedings of the last General Meeting, and of the Special Meeting held on the 27th April, were read and confirmed.

Elections.

Baboo Maudhub Chunder Sen, Dr. H. Chapman, and James Forlong, Esq.

Proposals.

James M. Hill, Esq., Barrah Factory, Tirhoot,—proposed by Capt. N. A. Staples, seconded by Dr. McClelland.

Joseph Hill, Esq., Barrah Factory, Tirhoot,—proposed by Capt. Staples, seconded by Dr. McClelland.

R. C. Guise, Esq., Assistant Surgeon, 73rd Regiment N. I.,—proposed by the Honorary Secretary, seconded by Dr. Strong.

H. V. Bayley, Esq., C. S.,—proposed by Baboo Pearychand Mittra, seconded by Baboo Ramgopaul Ghose.

R. R. Drabble, Esq., Merchant,—proposed by Mr. W. G. Rose, seconded by Mr. W. Earle.

W. H. Poe, Esq., Solicitor,—proposed by Mr. W. G. Rose, seconded by Mr. W. Storm.

Capt. W. K. Lloyd, Madras Army, Commanding Artillery, Aurungabad,—proposed by Dr. W. H. Bradley, seconded by the Honorary Secretary.

Capt. Commandant Peyton, 5th Regt. Nizam's Infantry, Aurungabad,—proposed by Dr. Bradley, seconded by the Honorary Secretary.

Charles Raikes, Esq., Civil Service, Mynpooree,—proposed by Mr. H. T. Raikes, seconded by the Honorary Secretary.

A. B. Mackintosh, Esq., Solicitor,—proposed by Mr. W. G. Rose, seconded by Mr. W. Storm.

Charles Warwick, Esq., Merchant,—proposed by Mr. Rose, seconded by Mr. Storm.

Lieut. T. C. Blagrave, (26th Light Infantry) Revenue Surveyor, States Trans-Sutledge,—proposed by Mr. Hercules Scott, seconded by Mr. D. F. McLeod.

Mr. Whampoa, Singapore,—proposed by Dr. K. M. Scott, seconded by the Honorary Secretary.

J. H. Allen, Esq , Merchant,—proposed by Dr. Huffnagle, seconded by Mr. W. G. Rose.

Baboo Gopaul Lall Tagore,—proposed by Baboo Ramanauth Tagore, seconded by Baboo Pearychand Mittra.

The Rev. William Carey, of Cutwa, eldest son of the late Rev. Dr. Carey, Founder of the Society, was proposed (on the recommendation of the Council) as an Associate Member, by Mr. W. G. Rose, seconded by Dr. Falconer.

The following motions, of which notice was given at the last general meeting, were brought forward :—

No. 1—*by Dr. Falconer.*—"That the words—'in order that members who take an interest in the question, may have an opportunity of expressing their assent or dissent'—be inserted after the words 'to be disposed of'—in the Section which was passed at the late *Special* Meeting, in substitution of Section 6, Chapter XI. of the Code of Bye-Laws."

Dr. Falconer offered a few remarks in favor of the proposed addition to the above Section. The motion having been previously seconded by Mr. Staunton was then put to the vote, and carried.

[With this addition, the Section in question will stand as follows :—

"Notice of motion on questions of finance, or other matters of importance, shall be given at a general meeting preceding that on which the subject is to be disposed of; in order that members who take an interest in the question may have an opportunity of expressing their assent or dissent ; and no motion of which notice has not been given, shall be carried at the meeting at which it is proposed, if any three members present vote for its postponement."]

No. 2—*by Col. Sage.*—"That with the exception of the President, Secretaries and Treasurer, the Office-bearers of this Society shall not be eligible for re-election until twelve months after the expiration of their tenure of office."

In the absence of the Mover, the above motion was taken up by Baboo Ramanauth Tagore, and seconded *(pro formâ)* by Dr. Falconer.

Dr. Falconer desired, on behalf of Col. Sage, to propose the following as an amendment, seconded by Mr. Rose :—"That with the exception of the President, Secretaries and Treasurer, the Office-bearers of the Society after a tenure of office during two years, shall not be eligible for re-election till the expiry of twelve months."

The amendment was put to the vote and carried.

The Chairman announced that the Council had nominated Mr. J. McMurray, subject to the confirmation of the meeting, to the situation of Gardener

to the Society, on a salary of 125 a month, to be raised to Rs. 150, as a maximum, after two years of approved services. The nomination was confirmed.

The Chairman further notified as a recommendation from the Council, that the proposal of the Garden Committee, in reference to the memorial of Mrs. D'Cruz, be confirmed;—namely,—That the sum of Rs. 720 be awarded to the widow of Mr. D'Cruz, late Gardener to the Society, or in the event of her demise to her surviving children, as a gratuity, to be distributed by monthly instalments of 30 Rupees. Carried unanimously.

The following presentations were announced :—

1. A further supply of orchideous plants from Assam. *Presented by Major Jenkins.*

2. A *Churka* from Tinnevelly. *Presented by C. J. Bird, Esq.*

3. The Journal of the Asiatic Society of Bengal, No. 1, 1850. *Presented by the Society.*

Flower Show.

A schedule of prizes awarded at the exhibition of flowers, held on the 17th of April, was next submitted, with the following remarks of the judges :—

The Committee have to report, that the result of the late flower show was, on the whole, highly satisfactory.

From the advanced period of the season, the number of sorts exhibited was considerably smaller than at the first quarterly show held on the 27th February; making due allowance on this score, the exhibition was a very fair one.

Among the novelties, or rarer specimens, may be noted some well-grown plants of *Gladiolus floribundus*, raised in the garden of Mr. F. Pereira, from bulbs procured from Holland: a *Gesnera*, in full flower, from Mr. G. Bartlett's garden: a beautiful specimen of *Dendrobium Devonianum*, *Picotees*, carnations and the ivy-leaved geranium, and a plant of *Stephanotis floribunda*, in flower, also from Mr. G. Bartlett's garden.

There were several fine plants of *Rondeletia odorata*, *Limonia spectabilis*, *Parsonsia corymbosa*, *Brunsfelsia Americana*, *Bignonia æquinoctialis*, and *Jacquinia ruscifolia*. Of annuals, the collection was not very varied; among the principal were *Phloxes*, *Portulacas*, *Snapdragons*, *Salpiglossis*, and a few others. *Verbenas*, *Asters*, *Solidago canadensis*, *Scabious*, *Oxalis*, violets, heart's-ease, &c. were also exhibited.

The competition was tolerably spirited, including a few new names. The produce of about 32 gardens was represented, and prizes awarded to 24.

The general arrangements for the display of the flowers were excellent, and the effect produced contrasted very favorably, with the former shows held in the Town Hall. The attendance—notwithstanding the heat of the

weather,—was also good, there having been probably not less than 700 visitors.

The Committee consider that the shows held in the Auckland Gardens, have proved eminently successful, and recommend, that they be conducted in the same manner hereafter: the plants being arranged according to the prize lists, if practicable.

The Committee have again to express their acknowledgments to Mr. Mather, for the trouble he took in the arrangements generally: and to Mr. G. Bartlett, for the aid given by him to the Deputy Secretary, in the disposition of the plants. The assistance rendered by Mr. McMurray from the Botanic Garden, proved very serviceable.

The list annexed shews, in detail, the plants for which prizes were awarded.

H. FALCONER, M. D.
WM. SAGE, *Lt.-Col.*
W. H. ELLIOTT.

Horticultural Exhibition.

A list of awards at the show of vegetables and fruits, which was held on the same day as the flower show, was also laid on the table, with the following report from the Committee:—

Notwithstanding the great disadvantage arising from the show having been held so much earlier than usual in the season, when the fine fruits, such as the mangoe, peach, litchee, grape, fig, &c., have not reached perfection, the Committee were much gratified to find so good an appearance pervading every thing that came under their inspection. Asparagus and artichokes were particularly well represented, exhibiting a decided improvement, both in respect to quantity and quality, over what is customary at this time of the year: the large tomato was in fair quantity; and a fine keeping potatoe was observed. Beet-root was particularly good, and perhaps should deserve a higher prize at this time of the year. Carrots were deserving of notice, and there was a very fair specimen of cos-lettuce; horse-raddish is also improving;—but the Committee would suggest that a higher premium should be offered in future by the Society to induce its being brought to perfection: the like recommendation they would accord to Brussels' sprouts, kale, Canada and Windsor beans, of which they were somewhat disappointed to find no specimens were brought forward, although considering them to have been properly in season. Of fruits, the apricots from Mr. Stalkart's garden and the strawberries from Mr. Elliot's showed satisfactorily to what perfection they may be brought: in another year the Committee would recommend that higher prizes should be awarded for early peaches and mangoes, the specimen of the former having been very good. All that the Committee have further to remark is, that it would be very desirable, if practicable, that tickets should be attached to the baskets of vegetables, stating the name

and kind of each article of produce, and whether raised from English, Cape, American or country-grown seeds, something in the same form as was adopted with the different classes of flowers and their varieties.

W. G. Rose. | Pearychand Mittra.
W. Earle. | G. T. F. Speede.

Communications on various subjects.

The following letters were likewise read :—

1. From Arbuthnot Emerson, Esq., intimating his readiness to meet the Society's request for acorns of the cork oak, to be procured from Gibraltar.

2. From C. Beadon, Esq., applying for seeds of sorts, on behalf of W. Edwardes, Esq., Superintendent of the Hill States, at Simla.

Resolved, that this request be met as regards *agricultural* seeds, but that Mr. Edwardes not being a Member, his application for *horticultural* seeds cannot be complied with consistently with the provisions of Sections 3 and 5, of Chapter V. of the Bye-Laws.

3. From C. Hollings, Esq., offering to the Society, on behalf of Mr. Lipscombe, Seedsman at Hobart Town, 8 packets of vegetable seeds, which he has lately brought with him from Van Dieman's Land.

It was agreed, on the recommendation of the Garden Committee, to purchase these seeds, if procurable at 5 Rs. per packet.

4. From Lieut. H. Dixon (22d M. N. I.), Commanding Koordah and Balasore Paik Companies, requesting to be furnished with the conditions of award and other particulars regarding the prize of 5,000 Rs. offered to the producer of the best machine for separating cotton-wool from the seed.

(Saturday, the 8th of June, 1850.)

The Honorable Sir Lawrence Peel, President, in the chair.

The proceedings of the last General Meeting were read and confirmed.

Elections.

Messrs. J. M. Hill ; Joseph Hill ; R. C. Guise ; H. V. Bayley ; R. R Drabble ; W. H. Poe ; Charles Raikes ; A. B. Mackintosh ; Charles Warwick ; J. H. Allen ; Capt. W. K. Lloyd ; Capt. J. Peyton ; Lieut. T. C. Blagrave ; Mr. Whampoa ; and Baboo Gopaul Lall Tagore.

The Rev. William Carey of Cutwa was also elected as an Associate Member.

Proposals.

Baboo Khettromohun Mookerjee, Deputy Collector of Nattore,—proposed by Baboo Pearychand Mittra, seconded by Baboo Ramgopaul Ghose.

Rajah Jadhubkissen Bahadoor,—proposed by Baboo Ramanauth Tagore, seconded by Mr. Robert Watson.

The following presentations were announced:—

A further supply of orchideous plants from Assam. *Presented by Major Jenkins.*

A maund of lucerne seed from the Punjaub. *Presented by Capt. F. C. Burnett, of the Artillery.*

(For distribution to members.)

Specimens of coarse cloth, made from the woolly down which covers the under-side of the leaf of a plant which grows wild in Kumaoon and Gurhwal, at an elevation of about 8,000 feet. *Presented by Major Charlton.*

The plant above referred to is the *Chaptalia gossypina.*

The following letters were also submitted:—

1. From G. H. Thwaites, Esq., Superintendent Royal Botanic Garden, Peradenea, Ceylon, requesting to be furnished with seeds or young plants of such species as would prove of value in Ceylon, and promising to reciprocate.

2. From Hercules Scott, Esq., Settlement Officer, States Trans-Sutledge, regarding the "*Phoollaiee*" of the Punjaub. Mr. Scott writes,—"I should be glad to know from you, whether a tree called the "*Phoollaiee*," which grows in great abundance and luxuriance in the Jullundur, is known in Bengal; and if so, what is its botanical name. This tree is to be found in every part of the Jullundur district, and is exceedingly valuable to the cultivator. The wood is hard in the grain, and is extensively used for the wood-work of wells, the roofing of huts, and the handles of agricultural implements. It requires no irrigation, appears to suit itself to the poorest and barest soils, and makes an admirable fence, a purpose to which it is very generally applied throughout the district. It flowers twice a year. The tree in full blossom is a graceful and beautiful object. So powerful too is the scent of the flower, when full blown, that the presence of the tree may be detected by it at a considerable distance. It is constantly to be found growing by the side of the common *Babool.* The two planted together form a handsome and almost impervious hedge. I am induced to make enquiries about this tree, partly because it is pre-eminently the "cultivators' tree" in these parts, partly because at this particular season of the year, crowded with its white, downy flowers, it presents so singularly graceful a feature in the landscape. I can send you any quantity of the seed should you feel inclined to give it a trial, or should the tree not be known to you down in Bengal."

Dr. Falconer observes, that the tree alluded to by Mr. Scott is the *Acacia modesta* of Botanists. "It does not occur wild in Bengal, but we have it in the Botanic Garden—small trees—which flower and fruit with us. It is one of the most characteristic trees of the Seik Provinces, and the sandy regions around Delhi." Dr. Falconer recommends the acceptance of Mr. Scott's offer for seed; and he has been applied to accordingly.

3. From C. Hollings, Esq., forwarding the vegetable seeds from Van Dieman's Land, alluded to in his letter read at the last general meeting; and recommending the Society procuring a large supply, for next year's distribution, from Mr. Lipscombe, of Hobart Town. "With regard to the season for sowing,"—observes Mr. Hollings,—"and chances of ships, I believe there is no substantial difficulty. Seeds of most flowers and vegetables are produced only *once* in the year, and if they are shipped as soon as gathered, (as the seeds now sent you have been), namely, in December or January, and reach India in March or April, they are capable of being distributed to the Society's members in all parts of India and sown before they are a twelve month old. Ships are constantly sailing from those colonies *to* India at all seasons, except from Augt. to Nov., and there would be no doubt or difficulty in finding opportunities for sending any quantity of seeds with perfect regularity. Nearly all the emigrant vessels come to India from every one of the Australian ports, and the intercommunication between them is constant. Between Hobart Town and Sydney a steamer plies regularly every month, and another between the latter place and Launceston on the northern side of Tasmania."

The Deputy Secretary mentioned that the greater portion of the seeds received from Mr. Hollings had been despatched, without loss of time, to several of the members at the most distant stations, with a request that they would communicate the result of their sowings. The report of the Society's Gardener showed that of 15 sorts that he had sown, 10 had germinated on an average of 77 per cent., but the others had not yet vegetated.

Mr. Hollings' letter was referred for the consideration of the Garden Committee when ordering consignments for next year.

4. From Messrs. Lawson and Son, of Edinburgh, intimating their intention of despatching by the June steamer, three specimen assortments of vegetable seeds, in accordance with the Society's request, containing 36, 47 and 70 packets respectively. Messrs. Lawson intimate that all these seeds are of the purest growth and raised in their nurseries. They hope, by bestowing every attention on the execution of this order, to secure and maintain the confidence of the Society.

5. From C. H. Howell, Esq., Secretary to the Peninsular and Oriental Steam Navigation Company, acknowledging the receipt of the Society's application for free freight for its annual supplies of garden and flower seeds, and intimating, in reply, the inability of the Directors to comply with this request to the extent desired, namely, for 2½ to 3 tons annually, but their willingness to allow that extent of tonnage at half the ordinary rate of freight.

The Deputy Secretary announced, with reference to the above letter, a recommendation from the Council, to the effect, that application be made again to the Directors of the P. and O. Company for freight free, to the

extent of one ton annually, it being probable that, by divesting the consignment of heavy seeds, such as peas and beans, it would not exceed that measurement.

It was proposed by the President, and agreed, that the recommendation of the Council be acted on.

6. From S. Simpson, Esq., Superintendent Cotton Experiments, Candeish, applying for a copy of the conditions of award for the prize of 5,000 Rs. for a cotton-cleaning machine, as offered by the Government of India, through the Society.

7. From Messrs. Cantor and Co., submitting a few printed copies of a list of Orchids found in Assam, which Mr. Simond, of Gowhatty, can supply at the rates detailed therein.

Before the meeting separated, a resolution from the Council was submitted, recommending that the proposition of the House Committee to accept the tender of Messrs. Jessop and Co. for railing the Metcalfe Hall, be confirmed.

Proposed by Baboo Pearychand Mittra, seconded by Sir Lawrence Peel, and *resolved*, that the recommendation of the Council be confirmed.

(Saturday, the 13th July, 1850.)

William Storm, Esq., Vice-President, in the chair.

The proceedings of the last General Meeting were read and confirmed.

Elections.

Baboo Khettromohun Mookerjee and Rajah Jadhubkissen Bahadoor.

Proposals.

J. Bean, Esq., Sub-Deputy Opium Agent, Monghyr,—proposed by Mr. G. G. Balfour, seconded by the Honorary Secretary.

G. H. M. Alexander, Esq., Civil Service, Etawah,—proposed by the Honorary Secretary, seconded by Dr. Huffnagle.

Baboo Govinchunder Dutt,—proposed by Mr. Hugh Fraser, seconded by Baboo Pearychand Mittra.

Presentations.

1. An additional supply of orchideous plants from Assam. *Presented by Major Jenkins.*

2. A small assortment of acclimated flower seeds. *Presented by Mr. C. Wheeler.*

3. Samples of Cuba, Gibali and Bhilsa tobacco, raised at Hazareebaugh from seed received from the Society; also sample of coffee grown in the same place, from seed received from Chota Nagpore. *Presented by Mr. Wheeler.*

4. Samples of *kuppas* and clean cotton, raised by Mr. J. G. Bruce, at Cawnpore, from Mexican seed acclimated at Coimbatore. *Presented by the Government N. W. P.*

5. Sample of cotton raised at the foot of the Rajmahal hills, from Mexican seed acclimated at Coimbatore. *Presented by Mr. J. Pontet.*

6. A *churka* from the batch last manufactured by Mr. Mather. *Presented by the Government of India.*

7. Four bottles containing nutmegs, cloves, coffee, &c. in various stages of growth. *Presented by Mr. Joseph Agabeg.*

8. A quantity of black vegetable dye from Maulmein. *Presented by Mr. A. C. Gregory.*

In the memorandum accompanying, it is stated that the above is a "sample of genuine black vegetable dye, prepared in the crude state by merely steeping the leaves [name of the tree not mentioned] in water, and the vegetable matter settled at the bottom has been rolled up with the finger, as the specimen exhibits, without being boiled, purified, or reduced to hard refined consistence."

9. Journal of the Indian Archipelago for April, May and June. *Presented by the Editor.*

10. Two copies of the same work, for the same period. *Presented by the Government of Bengal.*

11. A copy of Starkey's Punjabee Dictionary. *Presented by Sir H. M. Elliott.*

12. Amherst as a Sanatarium; by E. Ryley, Esq *Presented by the Author.*

A supplementary report from the Special Committee, which was appointed at the General Meeting in March last, to consider the suggestions of Baboo Cossinauth Chowdry regarding the translation, into Bengallee, of certain portions of the Transactions and Journal of the Society, was next read. The Committee, having previously recommended the adoption of the Baboo's suggestions, submit in their second report, the probable cost of carrying them into effect, under the supervision of a "Standing Translation Committee." The report having come under the consideration of the Council, they have "recommended to the Society to make the experiment, inviting tenders for the printing," but they add that,—" in recommending such trial they are not to be understood as approving even the maximum rate for translating, which they consider as very high."

After some discussion, notice of the following motions for the next General Meeting was given :—

No. 1—*Moved by Baboo Pearychand Mittra,*—" That a Standing Translation Committee be appointed in compliance with the recommendation of the Special Committee."

No. 2—Moved by Mr. W. G. Rose,—"That the recommendation of the Council be adopted, and that they be empowered to carry out the details."

The Hon. Mr. Bethune gave the following as a notice of motion for the next General Meeting :—

"That the Council be empowered to distribute seeds and plants to all public gardens, reporting their proceedings to the next meeting of the Society. No other resolution of the Council for disposing of, or pledging the funds or property of the Society to any amount exceeding Rupees ———, shall be acted upon, or be of any validity, until confirmed by the Society."

Communications on various subjects.

The following communications were next submitted :—

1. From the Rev. W. Carey, offering his best and warmest thanks to the Society for his election as an Associate Member.

2. From J. Thornton, Esq., Secretary to the Government of the N. W. Provinces, transmitting copy of a favorable report from the Superintendent of the Botanic Gardens, N. W. P., regarding certain cases of tea plants and American fruit trees forwarded from the Botanic Garden, Calcutta.

3. From Willis Earle, Esq., submitting extract of a report from Mr. Justin Finch, on the state in which a consignment of American fruit trees, despatched by steamer, in Ward's glazed cases, on the 15th of April last, had reached Shahpore Oondee, in Tirhoot. Mr. Finch's report, which is a favorable one, is dated 31st May.

In connection with the foregoing reports it was stated to the meeting, that the fruit trees which were purchased by the Society in March last, from the same batch as that above alluded to, were, with a few exceptions, doing well at the Society's garden. Of 46 plants, only 3 (2 gooseberries and 1 currant) had died. One-half the number had been lately put out in the open ground, by way of experiment, and the other moiety retained in pots.

4. From W. Thornton, Esq., Assistant Secretary Government North-Western Provinces, forwarding copy of a letter from the Collector of Cawnpore, with the specimens of cotton alluded to among the presentations, produced by Mr. J. G. Bruce from seed received from the Coimbatore farm through the Society. (Referred to the Cotton Committee for report.)

5. From Mr. C. Wheeler, dated Hazareebaugh, 27th May, regarding the samples of tobacco and coffee alluded to among the presentations.

6. From Baboo Chundermohun Bysack—a communication on the cultivation of arrow-root and tapioca.

The foregoing six communications were referred to the Committee of Papers.

7. From Lieut.-Col. T. E. A. Napleton, announcing the formation of an Agricultural and Horticultural Society at Delhi, and requesting that it may be considered a Branch of the A. and H. Society of India :—also applying for seeds of sorts.

Resolved,—That it be so considered, and, as recommended by the Council, that the application for seeds be complied with.

8. From H. White, Esq., Secy. of the Swellendan Agricultural Society, Cape of Good Hope, seeking from this Society, or any of its members, some information as to the possibility of obtaining a number of Angora goat rams, which would be considered an invaluable acquisition to the Cape Colony. "The late Col. Henderson,"—writes Mr. White,—"with much difficulty obtained a few and introduced them here, but only two were found to be serviceable, the others were supposed to have been purposely injured through jealousy of the parties at the place from whence they came, who did not wish to allow of their transmission ; the two have proved of great utility, and we are anxious to have a number imported if possible, and any information you could afford us as to the means of obtaining them, and the probable expense of purchase and transmission, you would confer a great obligation upon this community."

It was agreed to send a copy of the above letter to the Agricultural and Horticultural Society of Bombay, as more likely to be able to give the desired information.

9. From Mr. James Carter, London, acknowledging receipt of order for seeds, and promising to give it his best attention.

10. From Mr. Thomas Crawford, of the Customs Flotilla, Bombay, applying for a copy of the conditions for the prize of Rs. 5,000 offered by the Government of India, through the Society, for the best machine for divesting cotton-wool of the seed.

(*Saturday, the* 10*th August*, 1850.)

William Storm, Esq., Vice-President, in the chair.

The proceedings of the last General Meeting were read and confirmed.

Elections.

Messrs. J. Bean, G. H. M. Alexander, C. S., and Baboo Gobind Chunder Dutt.

Proposals.

The Rev. W. O. Ruspini, A.M.,—proposed by Baboo Pearychand Mittra, seconded by the Honorary Secretary.

J. Reddie, Esq., D.C.L., and F.R.S.E., Chief Judge, Small Cause Court,—proposed by Sir Lawrence Peel, seconded by the Honorary Secretary.

George Porteous, Esq., M.D.,—proposed by Mr. W. G. Rose, seconded by Mr. W. Storm.

William Joseph Allen, Esq., C.S., Balasore,—proposed by the Honorary Secretary, seconded by Dr. Strong.

James Church, Esq., (Firm of Braddon and Co.,)—proposed by Mr. W. Storm, seconded by Mr. Alfred Turner.

W. F. Gilmore, Esq., (Firm of Gilmore, Mackilligin and Co.,)—proposed by Dr. Huffnagle, seconded by Mr. G. R. French.

Presentations.

1. The Agriculturalist's Manual, by Peter Lawson and Son; (two copies) and a Treatise on the cultivated grasses, and other herbage and forage plants (one copy), by the same. *Presented by the Authors.*

2. Statistics of Agra, by C. C. Jackson, Esq., C. S., Collector and Magistrate of Agra. *Presented by Welby Jackson, Esq, C. S.*

3. Journal of the Indian Archipelago for July, 1850. *Presented by the Editor.*

4. Journal of the Asiatic Society of Bengal, No. 2, 1850. *Presented by the Society.*

The following three motions, of which notice was given at the last General Meeting, were next considered :—

No. 1—by Baboo Pearychand Mittra,—"That a Standing Translation Committee be appointed in compliance with the recommendation of the Special Committee," was seconded by Baboo Sibchunder Deb, and carried.

It was then proposed by Baboo Pearychand Mittra,—seconded by the Hon'ble Mr. Bethune, and *resolved,* that the Committee be composed of the following gentlemen :—

Baboo Ramgopaul Ghose, Rajah Pertaubchunder Sing, Baboo Radhanauth Sikdar, and Baboo Sibchunder Deb.

On the motion of Baboo Ramanauth Tagore, the names of Baboo Pearychand Mittra and Baboo Hurreymohun Sein were added to the Committee.

No. 2—by Mr. W. G. Rose,—"That the recommendation of the Council [in reference to the report of the Special Translation Committee] be adopted, and that they be empowered to carry out the details."

Mr. Rose intimated, that he had given the above notice under the impression that a *General* Meeting had not the power of adding to the list of the Society's Standing Committees, such power being reserved for the *Anniversary* Meeting; and he quoted Section 7, of Chapter X. of the Bye-Laws, in support of his opinion: but the meeting having now ruled otherwise, by adopting the first motion, he would wish to withdraw his. Mr. Rose's proposal for the withdrawal of his motion being put to the vote was negatived, whereupon the following amendment was moved by the Hon'ble Mr. Bethune, seconded by Baboo Pearychand Mittra, and carried :—

"That the report of the Council recommending the translation of certain papers on agricultural subjects be approved, and that it be referred to the

Council to arrange the details and make the experiment for such time as to them seem fit."

No. 3—by the Hon'ble Mr. Bethune,—"That the Council be empowered to distribute seeds and plants to all public gardens, reporting their proceedings to the next meeting of the Society. No other resolution of the Council for disposing of, or pledging the funds or property of the Society to any amount exceeding Rs. ———, shall be acted upon, or be of any validity, until confirmed by the Society."

After a little discussion, it was proposed by Baboo Pearychand Mittra, seconded by Mr. Hugh Fraser, that the following amendment be made, namely, —that the words, "exceeding Rs.———," be omitted, and the words, "beyond the current expenses of the establishment," be substituted. The amendment, which met the approval of the original proposer, was then put to the vote and carried.

Notice of Motion.

Mr. Hugh Fraser gave the following as a notice of motion for the next General Meeting.

"That the sense of the next General Meeting be taken as to whether or not the present meeting have caused a breach in the existing Bye-Laws of the Society by nominating and appointing a Translation "Standing" Committee, independent of the recommendation of the Society's Council."

—

A report from the Garden Committee was read. The Committee recommend certain steps being taken to procure additional fruit trees and flowering plants from various localities; they give a scale of rates for fruit grafts of mangoes, peaches, &c, deliverable from the garden to members and non-members, and allude to a few other matters of detail. They also append a report from the Gardener regarding the American fruit trees received from the Ice House in March; from which it would appear, that the pears, plums, peaches, and cherries are in a healthy condition, all the gooseberries dead, one of the currants, and one of the apples sickly. Of the 40 trees in hand, 21 have been planted out in the open ground by way of trial, while 25 have been retained in pots for planting out in the cold season.

The report of the Committee was, on the recommendation of the Council, confirmed in all its details.

—

A report from the Coffee and Tobacco Committee on certain samples of those products which were raised by Mr. Wheeler at Hazareebaugh, and laid before the last general meeting, was also submitted and agreed to. (Referred to the Committee of Papers.)

Read a communication from the House Committee, intimating that they have incurred an expense of Rs. 337 (one-half of which will be borne by the Public Library) beyond the amount of the estimate submitted by Messrs. Jessop and Co., for additional masonry for the wall of the railing now being placed round the Metcalfe Hall, and for a new bridge for the western entrance. "The Committee regret to say, that these additional expenses appeared to them to be so absolutely necessary, that they have taken upon themselves to sanction them in order to prevent delay." The Committee further suggest, that an additional sum of about one hundred rupees be incurred for a stone coping for the hall on the north side, to protect it from the water which will fall on it from the roof of the building.

Proposed by the Hon'ble Mr. Bethune, seconded by Mr. Hugh Fraser, and *resolved*,—"That the recommendation of the Council, on the report of the House Committee, in reference to the additional masonry for the railing and stone coping, be adopted,—but this meeting desires to express its opinion, that this should not form a precedent for the House Committee, or for any other Committee to incur any expense without the authority of the Society.

Communications on various subjects.

The following letters were likewise submitted:—

1. From Willis Earle, Esq., submitting a second report to the latest date (30th July) from Mr. Justin Finch, on the American fruit trees, in the garden of his brother, Mr. Jeffrey Finch, at Shahpore Oondee, Tirhoot.

2. From George Loch, Esq., Secretary Branch A. and Horticultural Society, Bhauglepore, applying for seeds of sorts, and for currant and gooseberry bushes, when available. Enclosing copy of certain resolutions passed at a meeting held on the 16th July.

3. From Dr. Adam Bell, Manager of the Public Garden at Lucknow, requesting to be furnished with an assortment of vegetable and flower seeds for the use of the garden.

It was agreed, on the recommendation of the Council, that these applications be complied with.

4. From F. W. Russell, Esq., Hooghly, submitting three musters of cotton, raised from Mexican seed at Hooghly and Bansberria, and requesting an opinion on them. (Referred to the Cotton Committee.)

5. From J. D. Olding, Esq., dated Hongkong, 22nd June, to the address of A. Emerson, Esq., promising to send some *Camellia* plants, for which Mr. Emerson had applied to him on behalf of the Society.

6. From Messrs. Peter Lawson and Son, Edinburgh, dated 18th June, advising the despatch of a box of vegetable seeds, as a trial assortment, in accordance with an order to that effect from the Society.

These seeds arrived by the last steamer, and are now in course of distribution to members in the country according to a list furnished and approved of by the Council.

7. From Mr. D. Landreth, of Philadelphia, announcing the despatch per *Arno*, which left Boston on the 6th May, of the annual consignment of vegetable and maize seed, and a small supply of cotton seed.

8. From C. Beadon, Esq., Commissioner for Post Office Enquiry, submitting a series of questions relating to the Post Office, and requesting a reply thereto, as far as they are applicable to the circumstances of the Society.

(Saturday, the 14th September, 1850.)

Wm. Storm, Esq., Vice-President, in the chair.

The proceedings of the last General Meeting were read and confirmed.

Elections.

The Rev. W. O. Ruspini, Messrs. J. Reddie, Geo. Porteous, W. J. Allen, James Church, and W. F. Gilmore.

Proposals.

J. W. Shearman, Esq., Merchant, Calcutta,—proposed by Baboo Pearychand Mittra, seconded by Mr. W. Storm.

H. Mackenzie, Esq., Indigo Planter,—proposed by Mr. W. G. Rose, seconded by Mr. Storm.

Dr. J. S. Login, Futteeghur,—proposed by Baboo Ramgopaul Ghose, seconded by Mr. H. V. Bayley.

Baboo Sibkissen Banerjee,—proposed by Baboo Radhamadub Banerjee, seconded by Baboo Pearychand Mittra.

C. E. Blechynden, Esq, Supt. Radnagore Silk Filatures,—proposed by Mr. Robert Watson, seconded by Mr. James Dalrymple.

Capt. Hugh Fraser, Engineers,—proposed by Mr. Rose, seconded by Mr. Storm.

Capt. A. Cops, H. C. Steamer *Enterprize*,—proposed by Mr. W. H. Poe, seconded by Mr. Rose.

John St. Edmund Burton, Esq.,—proposed by Baboo Pearychand Mittra, seconded by Baboo Ramgopaul Ghose.

Dr. Robert Young, Berhampore,—proposed by Dr. Huffnagle, seconded by Mr. Adam F. Smith.

Captain T. E. Colebrooke,—proposed by Dr. Strong, seconded by the Honorary Secretary.

E. Blyth, Esq., Calcutta,—proposed by Mr. W. F. Fergusson, seconded by Mr. G. R. French.

Augustin Wills, Esq., Merchant, Calcutta,—proposed by Mr. F. R. Hampton, seconded by Dr. Huffnagle.

Presentations.

Washington's Letters on Agricultural Subjects. *Presented by Mr. D. Landreth.*

Journal of the Indian Archipelago for August. *Presented by the Editor.*

Journal of the Asiatic Society of Bengal, No. 3 of 1850. *Presented by the Society.*

A collection of pine-apple plants and betel-nuts from Penang. *Presented by Joseph Agabeg, Esq.*

A small quantity of seed of the wild asparagus of the Punjaub. *Presented by Lieut.-Col. Corbett.*

The motion, of which notice was given by Mr. Hugh Fraser at the last General Meeting,—"That the sense of the next General Meeting be taken as to whether or not the present meeting have caused a breach in the existing Bye-Laws of the Society by nominating and appointing a Translation Standing Committee, independent of the Society's Council,"—was brought forward, and seconded by Mr. W. G. Rose. After a little discussion, the following amendment was put by Mr. H. V. Bayley, seconded by Baboo Ramgopaul Ghose, and carried :—

"That as the question seems to have been decided by the General Meeting of the 10th August 1850, the proceedings of which have been confirmed, the motion of Mr. Fraser, and the question of the construction of Sections 1 and 7, of Chapter X. of the Bye-Laws, be referred to the Council for report."

Notice of Motion.

Mr. Earle desired to give the following notice of motion for amending Section 1, of Chapter XI. of the Bye-Laws, by adding to it the words in italics :—" Ordinary General Meetings shall be held at the Society's apartments, Metcalfe Hall, on the second Saturday of every month, throughout the year, at half-past nine A.M., and *at 4 o'clock* P.M. *from October to March, and at 4½* P.M. *from April to September,* alternately,—*unless circumstances should render it expedient in the opinion of any General Meeting, to alter the day of the next General Meeting.*"

Communications on various subjects.

The following letters were submitted :—

1. From Lieut. Col. Stuart Corbett, dated from Hajeepore, in the Punjaub, 25th August, forwarding a small quantity of seed of the wild asparagus of the Punjaub.

2. From Capt. A. P. Phayre, submitting further particulars from Lieut. Fytche regarding the silk of Sandoway, and the mode of reeling it, &c. (Referred to the Committee of Papers.)

3. From Arbuthnot Emerson, Esq., intimating his readiness to meet the Society's request to obtain for the use of its garden, some particular descriptions of fruit trees, shrubs and plants from China.

4. From Dr. John Mayer, dated Walajabad, 16th August, offering his best acknowledgments to the Society for the attention paid to his request for specimens of cotton plants, of the soils in which they are grown, &c. and promising to send, in return, the result of his analysis.

5. From Lieut.-Col. Napleton, Hon. Secy. A. and H. Society Delhi, communicating the progress making in the newly constructed garden, and applying for seeds, plants and pecuniary assistance.

Resolved,—That the Parent Society's annual donation of fifty rupees and two silver medals be forwarded to Col. Napleton.

6. From A. H. Blechynden, Esq., Secretary House Committee, Metcalfe Hall, submitting extract from the proceedings of the Committee regarding the erection of out-offices for the building, and recommending that Messrs. Burn and Co.'s tender for the same, amounting to Rs. 977, be accepted.

Resolved,—That the Society pay one-half of the above amount, the Public Library having already agreed to meet the other moiety.

7. From Messrs. C. M. Villet and Son, Cape of Good Hope, advising despatch per *Tanjore* of the Society's consignment of vegetable seeds.

8. From Mr. Landreth, of Philadelphia, announcing the despatch per *Arno* of the Society's consignment of American vegetable seeds, including maize and cotton seed.

Letters were also submitted from H. Monckton, Esq., of Azimghur, applying for vegetable seeds for the use of the public garden at that station: from Mr. Dougherty, keeper of the Barrackpore Park, a similar request: from the Secretary of the Sudder Board of Revenue, for cotton seed for trial in Assam, and from T F. Henley, Esq., for cotton seed, especially the Sea Island sort, for trial at Mauritius.

It was agreed, on the recommendation of the Council, that all these applications be complied with.

Read a letter from the Secretary of the Free School, applying for seeds of sorts for the use of the lads of that Institution, with the view of assisting them to acquire a knowledge of gardening.

It was resolved, on the suggestion of the Council, to defer a compliance with this application till the Society is informed if any system of instruction in practical gardening is being carried out in the school.

Before the meeting separated, it was agreed that, in consequence of the second Saturday of the next month falling in the middle of the *Doorgah-poojah* holidays, no general meeting of the Society shall be held on that day, but that a special meeting take place in lieu of it, on the *first* Saturday of the next month, for the transaction of the ordinary business of the Society.

(Saturday, the 5th October, 1850.)

The Hon'ble Sir Lawrence Peel, President, in the chair.

The proceedings of the last General Meeting were read and confirmed.

Elections.

Messrs. J. W. Shearman, H. Mackenzie, C. E. Blechynden, Dr. J. S. Login, Baboo Sibkissen Banerjee, Capt. Hugh Fraser, Capt. A. Cops, Dr. R. Young, Capt. E. E. Colebrooke, Messrs. J. E. Burton, E. Blyth, and Augustin Wills.

Proposals.

Robert King, Esq., Sub-Deputy Opium Agent, Patna,—proposed by the Revd. Mr. Ruspini, seconded by Baboo Pearychand Mittra.

James Watson, Esq., Calcutta,—proposed by Mr. G. R. French, seconded by Dr. Huffnagle.

Gow, M. Smith, Esq., Ramnuggur factory, Jessore,—proposed by Dr. Huffnagle, seconded by Mr. French.

Dr. D. Begg, Calcutta,—proposed by Mr. F. R. Hampton, seconded by Mr. E. E. Wingrove.

Charles DeVerinne, Esq., Sericole, Jessore, -proposed by Mr. James Church, seconded by Mr. W. G. Rose.

The Right Revd. the Lord Bishop of Calcutta,—proposed by Dr. Falconer, seconded by Mr. Grote.

Presentations.

1. 120 pine-apple plants from Dacca. *Presented by J. G. French, Esq.*

2. A box of *Camellia* plants from China. *Presented by A. Emerson, Esq.*

3. A small supply of apple and pear seeds from Nepal. *Presented by the Hon'ble J. C. Erskine.*

Mr. Erskine mentions that the fruit of the red-streaked apple is decidedly superior to any he has met with in India; and the green sort affords a fine large apple, excellent for baking purposes.

4. Seeds of three species of *Banksia*, of a *Melaleuca*, and dried specimen of the flower of *Banksia serrata*, collected in February last, by Dr. J. B. Matthews on the shores of some of the sandy bays of Sydney harbour. *Presented by Messrs Willis and Earle, on behalf of Dr. Matthews.*

5. A large supply of acclimated onion and spinage seed. *Presented by G. E. Hewett, Esq.*

A report from the Council, in reference to the question of the construction of Sections 1 and 7, of Chapter X. of the Bye-Laws, which was referred to them at the last General Meeting, was submitted. The Council report that in their opinion, "neither Section 1 nor Section 7, of Chapter X., prohibit

the power exercised by the General Meeting of the 10th August as to the appointment of a "Standing Translation Committee," but they recommend that to remove the doubt that seems to have existed, the words, "and such other Committees as may have been appointed during the year," should be added after the words following in Section 7, of Chapter X."

After a little discussion the report of the Council was generally adopted. But the majority of the meeting being of opinion, that it would be more desirable to alter Section 1, of Chapter XVI., than to add to Section 7, of Chapter X., as recommended by the Council, the Hon'ble Mr. Bethune gave the following as a notice of motion for the next meeting :—

"In substitution of Section 1, of Chapter XVI. Beside the Standing Committees mentioned in Section 7, of Chapter X., the members assembled in General Meeting may appoint additional Standing Committees, and also Special Committees to report on any special matter relating to the objects and concerns of the Society. Notice of motion for the appointment of any additional Standing Committee shall be given in like manner as is required for a motion for alteration of the Bye-Laws. After the first nomination of any such additional Standing Committees, it shall be revised and the members of it appointed at the Anniversary Meeting only."

The motion of which notice was given by Mr. Earle at the last meeting, for amending Section 1, of Chapter X. of the Bye-Laws, by adding to it the words in italics, was next brought forward :—namely,—"Ordinary General Meetings shall be held at the Society's apartments, Metcalfe Hall, on the second Saturday of every month, throughout the year, at half past 9 A.M. and at 4 *o'clock* P.M., *from October to March, and at* 4½ P.M., *from April to September*, alternately, *unless circumstances should render it expedient, in the opinion of any General Meeting, to alter the day of the next General Meeting*."

After a little discussion it was proposed by the President, seconded by the Hon'ble Mr. Bethune, that the following amendment be made, namely, that the words "at half past 9 A.M.,"—and "alternately," be omitted. This amendment, which met the approval of the original proposer, was then put to the vote and carried.

A long report from the Cotton Committee on various musters of cotton raised from Mexican seed acclimated in the Government farm at Coimbatore, and received by the Society during the past twelve months, was submitted and referred to the Committee of Papers for publication in the Journal.

A report from the Garden Committee, suggesting an outlay of a sum not exceeding one hundred rupees, for the improvement of the Gardener's house, was next brought to the notice of the meeting. The report, on recommendation of the Council, was unanimously adopted.

The proceedings of a preliminary meeting of the Translation Committee were also read. The Committee report, that they have requested the Revd. Krishna Mohun Banerjee, at whose press they have agreed that the proposed new work shall be printed, to undertake the translation. They likewise give an idea of the proposed arrangement of articles in the said work, the title of which is to be "The Indian Agricultural Miscellany;" and further state in what manner they propose to distribute it.

A communication from J. G. French, Esq., regarding the culture of the safflower plant, and the mode of its manufacture into a mercantile product, as practised in the Dacca district, was likewise submitted, and referred to the Committee of Papers for the Journal.

Mr. Francisco Pereira, forwarded for exhibition to the meeting a dozen *Dahlias* of sorts, raised in his garden from bulbs received from England in June last; also a plant, in full blossom, of *Lycoris aurea*, imported by him from China in August last.

(Saturday, the 9th November, 1850.)

William Storm, Esq., Vice-President, in the chair.

The proceedings of the last Meeting having been read, Mr. Staunton expressed his objection to the confirmation of that portion of them which referred to the amendment proposed by the President, fixing the monthly meetings for the afternoon only, instead of for the morning and afternoon alternately, as had been the practice for some time past. Mr. Staunton submitted that the so-called amendment was not in fact an amendment on the original proposition, which was for an alteration of hours of meeting, according to the seasons, but an original proposition, of which, according to Section 6, of Chapter XI. of the Bye-Laws, notice should have been given. Mr. Staunton's objection (which was supported by the Honorary Secretary) was then put to the vote, and negatived; whereupon he desired to give the following, as a notice of motion for the next General Meeting:—

"That the Monthly Meetings of this Society do take place on the second Saturday of every month, and that they be held alternately in the morning and afternoon, as heretofore, at 9½ A.M., and at 4 P.M.

Elections.

The Right Rev. the Lord Bishop of Calcutta, Messrs. Robert King, James Watson, G. M. Smith, C. DeVerinne, and Dr. D. Begg.

Proposals.

Hugh Sandeman, Esq., Civil Service, Banda,—proposed by Mr. S. G. Smith, seconded by the Honorary Secretary.

John Squire, Esq., Civil Surgeon, Seonee,—proposed by the Honorary Secretary, seconded by Dr. Huffnagle.

Baboo Debendernauth Tagore,—proposed by Baboo Pearychand Mittra, seconded by Rajah Pertabchunder Sing.

Lieut.-Col. E. Gwatkin, Superintendent of Studs, N. W. Provinces,—proposed by Major A. C. Spottiswoode, seconded by the Honorary Secretary.

Henry Harrison Fell, Esq., Zeemaneeah Factory, Ghazeepore,—proposed by Mr. S. P. Griffiths, seconded by Mr. W. Stalkart.

Presentations.

1. Journal of the Indian Archipelago for Sept. and Oct. 1850. *Presented by the Editor.*

2. Copies of the same work, from July to Oct. 1850. *Presented by the Government of Bengal.*

3. Journal of the Asiatic Society of Bengal, No. 4 of 1850. *Presented by the Society.*

4. Specimens of two dyes and of cloth dyed by them. *Presented by M. P. Edgeworth, Esq.*

5. A large assortment of grains, &c. from Assam. *Presented by Major Jenkins.*

Major Jenkins mentions that these grains were collected for the London exhibition, but not being required for that purpose he sends them to the Society under the impression, that some of them at least might be acceptable for the Society's Museum. "The grains all neatly put up in the sheaths of the betel-nut"—observes Major Jenkins—"came from Mr. Masters of Golahghat, and the list of them I send enclosed; the others came from different quarters, and I have no memorandum of them.

6. A small collection of seeds from the Royal Botanic Garden at Peradinea, Ceylon. *Presented by G. H. Thwaites, Esq., Supdt. of the Garden.*

7. A maund of fresh safflower seed from Dacca. *Presented by J. G. French, Esq.*

8. A quantity of acclimated sweet-pea and mignonette seed, the produce of his garden. *Presented by A. Imlach, Esq.*

Mr. Imlach states, that the flowers from this sweet-pea seed have been improving in size and color for the last three years, and he is therefore inclined to give it the preference to Europe or American fresh seed.

9. A supply of Guinea grass seed from the Society's garden.

The motion of which notice was given at the last General Meeting by the Hon'ble Mr. Bethune, suggesting an alteration in Section 1, of chapter XVI. of the Bye-Laws, was next brought forward; but fell to the ground, in consequence of the absence of the mover.

Imported Vegetable Seeds.

A long and carefully compiled tabular statement from the Society's Gardener, shewing the number of vegetable seeds sown and germinated, with dates of sowing and germination, in the Society's Garden, was placed on the table. This statement includes, a portion of the trial assortment from Messrs. Lawson and Sons, Edinburgh, of the usual annual consignment from Messrs. Villet of the Cape, and from Mr. Landreth of Philadelphia; it shews that while the seeds from the latter localities have germinated most freely, with scarcely an exception, averaging 61 and 62 per cent., those from Edinburgh have come up but indifferently, averaging only 40 per cent.

Read a letter from Mr. Dougherty, of the Barrackpore Park, reporting most favorably on the germination of the American vegetable seeds supplied to him by the Society, as being good without an exception. "The different kinds of cabbage and cauliflower seeds, vegetated in three days, the plants appeared above ground strong and healthy, which is a sufficient proof the seeds were good, and well selected. It is unnecessary to particularize any seed, as I have tried them all, and invariably found them fresh, and good. At present I can only report on the vegetative qualities of the seeds, and the general appearance of the plants, which is good, but shall carefully observe their progress to maturity, and report the final result for the information of the Society."

Read also a letter from Messrs. Willis and Earle, submitting a report from Mr. Jeffrey Finch, of Shahpore Oondee, Tirhoot, on Lawson and Son's vegetable seeds. Of 40 sorts, 9 have grown well; 8 indifferently, the rest all failing. Mr. Finch, on the contrary, speaking of the supplies of seeds from America and the Cape, says, "both are excellent, hardly any seed failing."

Extracts of letters were also submitted from Major R. Houghton, Sealkote; Lieut.-Col. Congreve, Meerut; Lieut. John Eliot, Cawnpore, and Dr. Campbell, Darjeeling, all reporting unfavorably of the trial assortments of Messrs. Lawson and Son's vegetable seeds.

On the proposition of the Honorary Secretary, seconded by Mr. Staunton, it was resolved, that the members of the Floricultural Committee, and of the Fruit and Kitchen Garden Committee, report conjointly to the next General Meeting regarding the consignments of vegetable and flower seeds for next season.

Nursery Garden.

A report was submitted from the Gardener respecting the American fruit trees obtained from the Ice House, and certain other plants lately introduced. Of the fruit trees the Gardener states, that the peaches and plums are in good condition, such of the former as were planted out at the commencement of the rainy season are as healthy, if not healthier, than those retained in pots. The whole of the cherries that were planted out have died; such

as have been kept in pots continue in a healthy state. One of the three pears, in pots, has died. Of the apples, the three planted out are doing well, but one of the three in pots, which was sickly when first received, has lately died. All the currants in pots are thriving; two of the six planted out have died.

The Gardener reports, that the pine-apple plants lately received from Mr. J. G. French of Dacca are all in good condition; but that on opening the glazed case, all the *Camellia* plants which were presented by Mr. Arbuthnot Emerson, were found to be dead. The Punjab wild asparagus, the seed of which was received from Col. Corbett, is doing well.

On the perusal of the above report, the desirableness of a similar one being furnished monthly, as shewing the progress of various cultures, and of the garden generally, was adverted to, and it was agreed that, the Garden Committee should be requsted to have such a one periodically prepared.

Communications on various subjects.

From A. Emerson and R. S. Walker, Esqrs., Joint-Agents and Supdts. P. and O. Company, intimating that the Directors of the Company have acceded to the Society's request to have one ton of seeds forwarded annually to Calcutta, freight free, by the Company's Steamers.

Resolved,—That the best thanks of the Society be given to the Directors for their ready compliance with its request.

From Lt.-Col. J. Alexander, Gun-Carriage Agent, Futteeghur, and from Lt.-Col. C. W. Grant, of the Bombay Engineers, applying for the conditions of the award and other particulars relative to the prize of 5,000 Rs. offered by the Government of India, through the Society, for the best machine for separating cotton-wool from the seed.

From Mr. James Carter, Seedsman and Florist, London, enclosing a list of the consignment of flower seeds ordered by the Society.

A few well-grown plants of *Dahlia,* in full flower, raised in pots; also a new variety of *Chrysanthemum,* grown from a cutting received from Simla last cold season, were forwarded by Mrs. Macleod for the inspection of the members.

It having been brought to the notice of the meeting, that there was a vacancy in the "House Committee," it was proposed by the Honorary Secretary, seconded by Mr. Earle, and agreed, that Mr. Staunton's name be added to that Committee.

(Saturday, the 14th December, 1850.)

William Storm, Esq., Vice-President, in the chair.

The proceedings of the last Meeting were read and confirmed.

Elections.

Dr. John Squire, Baboo Debendernauth Tagore, Lieut.-Col. E. Gwatkin, Messrs. Hugh Sandeman, C. S., and H. H. Fell.

Proposals.

William Ewing, Esq., Merchant, Calcutta,—proposed by Dr. Huffnagle, seconded by the Honorary Secretary.

The Rev. Thomas A. C. Firminger, Ferozepore,—proposed by the Hony. Secretary, seconded by Mr. W. Storm.

W. L. Harwood, Esq., Calcutta,—proposed by the Hony. Secretary, seconded by Mr. W. Storm.

R. C. Bell, Esq., Calcutta,—proposed by Dr. Huffnagle, seconded by Dr. Begg.

Walter Landale, Esq., Lutteepore factory, Bhaugulpore,—proposed by Mr. Geo. Barton, seconded by Dr. Begg.

James Church, Esq., Junior, Merchant, Calcutta,—proposed by Mr. W. G. Rose, seconded by Mr. James Church, Senior.

W. Patton, Esq., Maulmein,—proposed by the Hony. Secretary, seconded by Mr. A. Grote.

George MacNair, Esq., Babookally factory, Jessore,—proposed by Dr. Begg, seconded by Mr. F. R. Hampton.

Rajah Nurrender Kissen Bahadoor,—proposed by Baboo Ramanauth Tagore, seconded by Rajah Pertaub Chunder Sing.

Presentations.

1. Annales des Sciences Physiques et Naturelles, d'Agriculture et d'Industrie. Tome XI. 1848.—*Presented by the National Society of Agriculture, Natural History, and Useful Arts of Lyon.*

2. The Journal of the Royal Asiatic Society of Great Britain and Ireland. Vol. XII. Part 2.—*Presented by the Society.*

3. The Journal of the Indian Archipelago, &c., for Nov. 1850.—*Presented by the Government of Bengal.*

4. A Geographical description of the Punjab, in Panjabi.—*Presented by Sir Henry Elliot.*

5. Two maunds of safflower seed.—*Presented by R. W. G. Frith, Esq.*

6. A quantity of acclimated China tea seed from the Himalayan Nurseries.—*Presented by Dr. Jameson.*

7. Forty-eight crocus bulbs of 4 sorts.—*Presented by Francisco Pereira, Esq.*

8. Sixty-seven *Narcissus* bulbs, just recived from Simla, in excellent condition.—*Presented by Mrs. C. Macleod.*

9. An assortment of bulbs lately received from England, consisting of *Anemone*, tulips, hyacinths, *Gladiolus*, snowdrop, *Narcissus* and crocus.—*Presented by Dr. Strong.*

10. Musters of cotton from the Darjeeling Moruug.—*Presented by Dr. Campbell.*

11. Specimens of fibre of the cultivated and wild *Rheeas* of Assam.—*Presented by Major Jenkins on behalf of Major Hannay.*

12. Specimen of a cloth, manufactured by the Angami Nagas, and musters of the raw fibre from which it is fabricated.—*Presented by Major Jenkins on behalf of Lieut. G. F. Vincent.*

The following plants, submitted for the inspection of the members, were placed on the table :—

Eleven varieties of *Chrysanthemum* in full flower, grown in pots (among them a new variety, a cutting of which was received from Simla), a plant, in blossom, of *Inga hematoxylon*, also a few cut specimens of *Dahlias*, all raised in her garden.—*Forwarded by Mrs. Macleod.*

Five sorts of *Chrysanthemum* in full flower, among them one (a yellow) very perfectly formed,—the produce of his garden.—*Forwarded by Mr. R. Wood, Junior.*

A few well-formed cut specimens of *Dahlias*, from the garden of Mr. Emin, at Garden Reach, were also placed on the table.

The motion of which notice was given by Mr. Staunton at the last General Meeting, namely,—"That the Monthly Meetings of this Society do take place on the second Saturday of every month, and that they be held alternately in the morning and afternoon, as heretofore, at 9½ A.M. and at 4 P.M."—was brought forward, seconded by Mr. Wale Byrne, and carried

Nursery Garden.

A report from the Garden Committee was next submitted. The Committee intimate, that a portion of the Garden on the western side, which was formerly fallow, has been now laid out, to the extent of three and half beegahs, with cocoanuts and betel-nuts from the Straits, from the stock presented in the early part of the year by Mr. Joseph Agabeg ; also that the pinery has been considerably enlarged by the addition of the stock from Dacca and the Straits, lately presented by Mr. J. G. French and Mr. Agabeg. The kitchen and flower gardens are in good order ; the peas and beans raised in the former from American and Cape stock, occupying rather more than three beegahs, look well, and will probably yield a large quantity of seed for distribution next year. The orchard ground, consisting of upwards of twenty beegahs, has been well attended to. The American fruit trees, with exception of one or two kinds (as detailed in the Gardener's

report submitted at the last general meeting) look tolerably healthy, both those put out in the open ground, and those retained in pots. The Committee think it desirable that steps should be taken to procure a small collection of the most ornamental kinds of trees and shrubs, as also another small assortment of fruit trees from the United States, to be brought out in the same manner as the fruit trees by Mr. Ladd of the Ice House. The Committee allude to various articles, such as a water-engine, syringe, bullock-cart, &c. required by the Gardener, to enable him to carry on his work more expeditiously and economically, and recommend that the sum of Rs. 200 be allowed for the purpose; and suggest, in conclusion, with reference to the large quantity of ground now brought under cultivation, that an additional number of hands be entertained, increasing the monthly expenditure by Rupees 23.

Proposed by Mr. Staunton, and agreed, that the recommendation of the Council—"that this Report be submitted to the general meeting for adoption,"—be confirmed.

In connection with the above, the Gardener's monthly report was read. Mr. McMurray states, that the flower seeds received from Mr. Carter of Holborn, have germinated freely, and are doing well; but that the herb seeds of 12 sorts from Messrs. Lawson of Edinburgh, have totally failed, not having been able to raise a single plant, though every attention was bestowed on them. He has also failed with the three kinds of Nepaul apple seeds received from the Honorable Mr. Erskine, but has succeeded in raising a few plants from the pear seeds. Of the small collection of seeds from Sydney, contributed by Dr. J. B. Matthews, three sorts of *Banksia* have germinated, as also one description of seeds received without a name. The seed of *Chaptalia gossypina* received in May last from Major Charlton, has germinated, and several well-grown healthy plants are now in hand. The Gardener adds, that a new species of *Clerodendron* from China, presented last year by Mr. G. Bartlett, has flowered abundantly, and a quantity of seed will be matured in the course of a few weeks; further, that the pine-apple plants are growing vigorously, and some of the larger ones about to show fruit.

An extract from the proceedings of the House Committee was brought forward, announcing the completion of the Out-offices of the Metcalfe Hall, and offering a few suggestions regarding certain other matters of minor importance. *Resolved*, that the proceedings be confirmed, and that the Society's proportion of the cost of erecting these buildings, namely, Rs. 523, be paid; and further, that, as proposed by the Council, the subject mooted by one of the members of the Committee be referred to Messrs. Burn and Co., to ascertain the expense attending his suggestion, and its feasibility.

Communications on various subjects.

The following letters were likewise read :—

1. From Dr. Campbell, regarding the cultivation of cotton in the Darjeeling Morung, and the capabilities of that tract for the extensive growth of superior cottons. A resolution of the Council, by whom Dr. Campbell's communication had been considered at a late sitting, having been submitted to the following effect ;—" that the musters accompanying Dr. Campbell's letter be referred to the Cotton Committee, and the memorandum to the Committee of Papers, and that his letter be recommended to the favorable consideration of the Society," it was resolved,—that one-half of the imported Upland cotton seed now in store be at once despatched to Dr. Campbell, and the remainder, or so much as may remain on hand at the expiration of a fortnight, from the date of advertising it for general distribution, be also forwarded to him, and that his name be registered for portion of the next consignment, which may be expected in June 1851.

2. From Major Jenkins, respecting the species of *Rheea* and Naga cloth, alluded to among the presentations.

3. From W. Landale, Esq., applying for a quantity of cotton seed sufficient to sow 50 beegahs in the Bhaugulpore district.

4. From R. B. Garrett, Esq., Magistrate and Collector of Cuttack, requesting to be supplied with a quantity of cotton, tobacco, and wheat seed, for distribution among the zemindars of that district.

Resolved,—That the above applications be met now, according to the extent of the Society's means, and that the names of Messrs. Landale and Garrett be registered for further supplies as received.

5. From H. Frost, Esq., Engineer Government Cotton Experiments, Dharwar, intimating his intention of forwarding a seven saw-gin, made by him in Nov. 1849, upon an improved principle, to compete for the prize of Rs. 5,000 offered by the Govt. of India, through the Society.

6. From G. Loch, Esq., Secretary Branch A. and H. Society, Bhaugulpore, applying for the annual donation of Rs. 50 granted by the Parent Society.

7. From Messrs. C. Villet and Son, Cape of Good Hope, advising despatch per *Maidstone* of a box of vegetable seeds, to complete the annual order of the Society.

Before the members separated it was agreed, that a reference be made to the Joint Committees (Kitchen Garden and Floricultural) which are now sitting, to determine at what time the first horti-floricultural exhibition of the season shall be held.

Report from the Council to the Anniversary Meeting, January 11th, 1851.

Introduction.

The Council, in making this their first Annual Report, are happy to state, that the affairs of the Agricultural and Horticultural Society of India are equally as satisfactory in every respect as they were at the last Anniversary.

Accession of Members.

The number of Members elected has been larger than in any year since 1843, as will be seen on reference to the following tabular statement, which, also, in continuation of those in former reports, affords full details, and represents, at the same time, an analysis of the constitution of the Society :—

Classification.	In 22 former years.	In 1843.	In 1844.	In 1845.	In 1846.	In 1847.	In 1848.	In 1849.	In 1850.	Gross Total.	Total real number at close of 1850, after deducting lapses.
Honorary Members, ...	10	1	0	0	1	0	1	0	0	13	9
Associate Members, ...	1	0	1	0	0	0	0	0	1	3	3
Corresponding Members, ...	0	0	0	0	1	0	0	0	0	1	1
Civilians, ...	192	14	17	9	13	15	22	8	10	300	140
Merchants and Traders, ...	160	16	10	15	14	12	13	10	14	264	111
Indigo and other Tropical Agri-	167	15	6	2	15	6	5	1	9	226	63
culturists, ...	127	16	4	13	10	11	11	11	9	212	90
Military Officers, ...	73	1	4	2	0	2	3	5	7	97	28
Medical Officers, ...	51	5	1	6	2	14	5	6	9	99	47
Asiatics, ...	12	1	0	1	1	0	0	0	2	17	5
Clergy, ...	34	2	2	2	1	0	0	6	4	51	19
Law Officers, ...	7	0	2	0	0	2	0	2	2	15	11
Miscellaneous, ...											
	834	71	47	50	58	62	60	49	67	1298	527

Deaths, Resignations, &c.

The lapses alluded to in the last column consist of 9 deaths, 39 resignations, 14 whose names have been struck off for non-payment of subscriptions, besides 78 whose names have been removed from the list, in accordance with Section 6, of Chapter 3 of the Bye-Laws, their absence from India having extended beyond four years ; making in all 140.

Of the above-mentioned number (527), 37 are Members who have compounded for their subscriptions ; 61 are absent from India, and consequently non-paying ; 9 are Honorary ; one a Corresponding ; and three are Associates (in all 111), leaving 416 as the actual number of paying Members on the books of the Society on 1st January 1851, or 19 more than last year.

In alluding to the casualties of the past year, the Council would express more prominently their regret at the loss which the Society has sustained by the demise of Lieut.-Col. J. R. Ouseley, late Agent to the Governor General in the S. W. Frontier. The interest he took in promoting the cause of Agriculture and Horticulture generally, is abundantly manifested in the proceedings of the Society for several years past; but more especially do they record his continued exertions in bringing to notice, and in improving the vegetable products of the extensive district under his charge, as well as the valuable grains and seeds of Central India. The blank caused by the death of so active and zealous a Member and Correspondent cannot be readily filled up. The other Members, whose demise the Society is called on to record are, Lieutenant Waghorn, who was elected an Honorary Member in 1836 for his exertions in obtaining cotton seed from Egypt at a time when, owing to the jealousy of the late Pacha, it was extremely difficult to export it; Mr. T. B. Swinhoe, Solicitor, Calcutta; Mr. John Watson, Indigo Planter; Mr. Thomas Bracken, formerly a Merchant of Calcutta; Mr. J. P. Marcus, Indigo Planter; Capt. W. Spiers, of Rangoon; Mr. E. Haworth, Sugar Manufacturer, Dacca, and Mr. W. McDowall, Indigo Planter at Rungpore.

The subject next demanding notice is the state of the Finances.

Finances. This, the Council are happy to remark, is satisfactory, as the statement of receipts and disbursements appended to this Report will show. The total receipts amount, it will be observed, to Co.'s Rs. 19,861-1-3, to which sum the balance of the previous year, Rs. 2,431-10-7 is to be added, forming a total of Rs. 22,292-11-10. The disbursements during the year have amounted to Rs. 19,083-14-10, and there has been invested in Government Securities the sum of Rs. 2,116-14-2, leaving a cash balance in the Bank of Bengal, in the hands of the Government Agent, and with the Treasurer, on the 31st December 1850, of Rs. 1,041-14-10.

The vested fund, with the addition above noted, now amounts to Rs. 22,366-10-8, as per account current of the Government Agent, dated 31st December 1850.

The items of receipts and disbursements are so fully detailed in the statement before referred to, that it is, the Council conceive,

unnecessary to allude further to them in this place than to draw attention to the sum of Rs. 1,276-1-6, exhibited as a debit on account of improvements to the Metcalfe Hall, being the Society's proportion of the cost of an iron railing, and the expense of erecting a range of out-offices to the Building.

In respect to the arrears of subscription, it is gratifying to note that, of the total amount of Rs. 9,053-1-9 shewn due at the end of 1849, there has been realized during the year, the sum of Rs. 4,750-6-9, still leaving a balance of Rs. 4,302-11 : of which the sum of Rs. 2,334-7 may be considered as irrecoverable,—Rs. 1,946-7 thereof being the arrears due from 14 defaulters alluded to in the early part of this report, and the remainder being composed of arrears of deceased Members, and of some who have retired from India. The balance of these arrears, after deduction above noted, is Rs. 1,968-4, and the unpaid subscriptions for 1850 amount to Rs. 4,505-8-9, forming a total due to the Society, at the end of the year, as explained in lists Nos. 1 to 4 annexed, of Rs. 6,473-12-9, being Rs. 2,580 less than last year.

The liabilities amount to £172-9-10, for the last consignment of English flower seeds and for books supplied by Messrs. Smith, Elder and Co., and Rs. 590-9-3, the balance of Messrs. Jessop and Co.'s bill for the iron railing for the Metcalfe Hall. These will be fully met by the subscriptions realizable in the early part of 1851.

Nursery Garden.

The Nursery of the Society has been duly attended to during the past year by the Garden Committee. The portion appropriated for fruit trees, now occupying more than one-third of the entire area, is in excellent order, and will probably become more useful and valuable in the course of a few years. The demand for grafts, though still limited, has been greater than during the previous twelve months. A tolerably large supply of ornamental plants has been distributed to Members; and all applications for useful products, such as arrow-root, Guinea grass, tapioca, sugar-cane, &c., have been liberally responded to. Through the kindness of Messrs. Joseph Agabeg and J. G. French in supplying plants of the best descriptions of pine-apples from the Straits and from Dacca, the Committee have been able to extend the pinery con-

siderably. The Society is also indebted to the former gentleman for a collection of fine cocoanut and betelnut plants from the Straits; these have been put down on a plot of ground, which was formerly fallow, on the western-most side of the garden. Through the kind and liberal aid of Major Jenkins, the Committee have been enabled to add very considerably to the stock of orchideous plants, which now occupy a large portion of the conservatory. The experiment on the grafts of American fruit trees, which were imported in a cargo of ice by the *Epaminondas* in March last by the Proprietor of the Ice House, though necessarily carried out on a very limited scale, has proved sufficiently encouraging to induce the Committee to recommend that another assortment be procured from the United States in the same manner, together with a small collection of ornamental trees and shrubs. The Council have to mention, by way of record, before closing this portion of their report, that the death of Mr. D'Cruz, in February last, having created a vacancy in the post of Head Gardener of the Society, Mr. McMurray was nominated thereto, and that they have reason to be satisfied with his services. In testimony of the zealous and faithful services, during a course of twelve years, of its late Gardener, the Society has voted to his widow a gratuity of Rs. 720: to be distributed by monthly instalments of 30 rupees.

Horti-floricultural Exhibitions.

The usual support has been accorded in the departments of horticulture and floriculture. The show of vegetables and fruits, which was held in the Town Hall in the early part of February, was a very satisfactory one, being pronounced as about the best that has been held under the auspices of the Society: on that occasion a silver medal and the sum of Rs. 258 were awarded to the successful candidates. The second exhibition was held conjointly with that of flowers in April, under tents, in the Auckland Circus, and although it took place earlier than usual in the season, when the finer sorts of fruits, such as the mango, peach, litchee, grape, fig, &c. had not reached perfection, the judges "were gratified to find so good an appearance pervading every thing that came under their inspection." Celery, asparagus and artichokes, the three kinds of vegetables in the culture of which native gardeners are most backward, were particularly well represented, exhi-

biting a decided improvement, both in respect to quantity and quality: 101 Rupees were distributed in prizes.

The first flower show of the season was held in the Auckland Circus at the close of February, at which the competition was greater than at any previous exhibition, specimens having been sent in from upwards of 40 gardens, to 32 of which, prizes to the extent of Rs. 250 were awarded. Altogether, this first attempt at holding a show in the open air proved sufficiently successful to induce the judges to recommend a continuance of it whenever the state of the season would permit. The second exhibition took place in the same locality in the middle of April, and attracted a considerable number of visitors—probably not less than 700—notwithstanding the heat of the weather. The competition was tolerably spirited, the produce of 32 gardens being represented, to 24 of which, prizes amounting to Rs. 101, were given. The general arrangements for the display of the flowers on this occasion were excellent, and the effect produced contrasted very favorably with the former shows held in the Town Hall.

Importations of vegetable and flower seeds.

The Council are happy to announce that the last importations of vegetable seeds from the United States and the Cape have given satisfaction. The flower seeds from England have not been so generally approved of as the consignment received in 1849; but, from the Report of the Committees specially appointed to determine on the consignments for another season, the Council are inclined to attribute the failures that have been notified rather to a want of proper management in preparing the soil, &c.,—especially for the more delicate descriptions of annuals,—than from any other cause; and the more so from the fact, that when carefully attended to, as in the case of trials made at the Society's Garden at the Barrackpore Park, and by a few zealous amateurs, the results have been as satisfactory as could be expected. The trial assortments of vegetable seeds from Van Dieman's Land and Edinburgh have proved indifferent, especially the latter; but a further test has, nevertheless, been recommended from both localities, at a different time of the year, to meet the requirements alike of resident and non-resident Members. The Council have the pleasure to add, that the Peninsular and

Oriental Company have most liberally responded to the Society's application by granting freight for seeds by their steamers to the extent of one ton annually. For this boon the Council consider the Society to be mainly indebted to the interest taken in its operations by Mr. Arbuthnot Emerson, the local Superintendent, and who, it should be added, has likewise most readily met the wishes of the Society in various other ways; but this may, perhaps, be more properly noticed in detail in the next Annual Report.

Formation of a Branch Society at Delhi.

Allusion was made in the last report to the loss which the Branch Agricultural and Horticultural Society at Bhauglepore had sustained by the departure of Lieutenant-Colonel Napleton, its founder, and for six years its most active and zealous Secretary. The same interest in the cause of Agri-horticulture has led him to establish a Branch Society and Garden at Delhi, which will no doubt, though recently formed, soon attract an equal degree of interest, under his able management, as has marked the career of that of Bhauglepore. The Society has been in correspondence during the year with both these Branch institutions, and has furnished supplies of seeds to them, and also to the Branch Gardens at Hooghly, Berhampore, Mirzapore, Lucknow, &c.

Translation into Bengallee of the Transactions, &c. of the Society.

In addition to other subjects of interest, the attention of the Society has been turned towards the translation into Bengallee of such portion of its Transactions and Journal as are likely to prove serviceable to the Native community; and the better to effect this object a Translation Committee has been added to the other Standing Committees of the Society, before whom, in conjunction with the Committee of Papers, various documents have been placed to enable them to commence, with the least practicable delay, the publication of a separate work, which is to be entitled "the Indian Agricultural Miscellany."

English exhibition in 1851 of the industry of all nations.

Under the impression that it was incumbent on the Society to take a part in arranging for transmission to England specimens of Indian products for the grand exhibition of 1851, the Members assembled at the General Meeting held in January, appointed a Committee for that

purpose, who submitted a report at the following monthly meeting. The Committee were of opinion, that "several of the products of Indian industry are of so superior a quality as to admit of competition with similar articles produced in any other country, and that the opportunity, if suitably followed up, might be made to subserve the objects of the Society, importantly." The Committee named a few, among many other products and articles which, in their opinion, should be transmitted, and moreover, suggested in what manner funds might be raised to carry their proposition into effect. Before, however, any steps could be taken to act on these suggestions, information was received "that the Court of Directors were prepared to give their cordial co-operation in carrying out the wishes of Prince Albert by obtaining from India such specimens of the products and manufactures of that country as may tend to illustrate its resources, and add to the interest of the great national exhibition of which His Royal Highness is the patron;"—and that they had accordingly issued the necessary instructions to the Indian Government. Under this altered state of affairs, the Society conceived it unnecessary to move any further in the matter beyond conveying to the Government the offer of its assistance in any way that might be considered desirable. Though, therefore, the Society has not taken any prominent part in this interesting subject, the Council deem it proper to notify, by way of record, what its original intentions were, and in what manner it had proposed to have carried them out.

Prize for an improved cotton-cleaning machine.

Referring to the particulars given in the last annual summary, respecting the prize of Rs. 5,000 offered by the Government of India, through the Society, for the best machine for divesting indigenous cotton-wool of its seed,—the said prize to be awarded on the 1st March 1852,—the Council have the pleasure to add, that the subject appears to have excited considerable interest throughout the country, many applications having been received, since the announcement of this proposed reward, for full particulars of the conditions under which it is to be given; and several residents in various parts of the country having signified their intention of competing for it. In connection with this subject, it may be mentioned that, in pursuance of a resolution passed in 1849, the Society has obtained for its Museum

full-sized working models of machines for separating cotton-wool from its seed known to be in practical use, with some useful information regarding the mode of working them, amount of daily work performed, cost, &c.

But little has been done, since the publication of the last report, in the Literary Department, only one number, or part, of the Journal having been issued (Part 1 of Vol. VII.) This, however, contains several interesting papers, among which may be mentioned Major Madden's contribution on Himalayan *Coniferæ;* notices respecting coffee, cochineal, cotton, tea, the China grass-cloth plant; and some useful information under the head of correspondence. The Council hope to publish another number to complete this volume, in the early part of 1851, sufficient materials having been accumulated for that purpose.

Literary Department.

The Council conceive they cannot better conclude this brief summary of the Proceedings of 1850 than by requesting the continued hearty co-operation of the many Members of the Society scattered all over India. They would, more particularly, invite contributions for the Journal from correspondents in the newly acquired provinces of Scinde and the Punjab, for they have certainly the means of supplying much useful and interesting information regarding those countries, especially of their vegetable products, of which our knowledge is at present very limited.

Statement of Receipts and Disbursements of the Agricultural and Horticultural Society of India, from **1st** *January to the* 31*st December,* 1850.

RECEIPTS.

	Rs.	As.	P.	Rs.	As.	P.
From Members, subscriptions collected during the year for the ordinary purposes of the Society, ...	14,189	6	0			
,, Ditto, additional temporary subscriptions to assist in meeting the Society's proportion of the debt on the Metcalfe Hall, ...	39	0	0			
				14,228	6	0
,, The Most Noble the Marquis of Dalhousie, annual donation for 1849-50, ...	1,000	0	0			
,, Government annual donation, ...	1,045	0	0			
,, Ditto, monthly allowance for 12 months, at 135-13 6 per month, ...	1,630	2	0			
				3,675	2	0
,, Sir Lawrence Peel, donation to the Society for the year, to encourage the culture of flowers, &c., ...				400	0	0
,, Accruings of interest on fixed assets, ...				1,022	8	0
,, Proceeds of sugar-cane delivered from the Nursery Garden, ...	16	0	0			
,, Ditto of mango, &c. grafts, ditto from ditto, ...	62	10	0			
,, Ditto of a portion of surplus Cape and American vegetable and English flower seeds, ...	312	8	0			
,, Ditto of copies of the Transactions of the Society, ...	24	0	0			
,, Ditto of copies of the Journal of the Society, ...	15	12	0			
,, Ditto of copies of Fenwick's Hand-book of Gardening, ...	10	0	0			
,, Ditto of old seed boxes of sorts, ...	14	2	0			
,, Members, being the amount of freight, &c. on boxes of seeds to their addresses paid by the Society in 1849 and 1850, ...	23	9	9			
,, J. G. Bruce, in part payment of balance Rs. 14-6 of certain expences incurred in 1849, for procuring cotton seed from the Government farms at Coimbatore, ...	10	0	0			
				488	9	9
Assignee, Estate Alexander and Co., being the amount of fifth dividend at the rate of 3 As. per 100 Co.'s Rs. on the Society's claim of Sa. Rupees, 24,783-14 8, ...				46	7	6
Total receipts, Co.'s Rs.				19,861	1	3
By Balance, in the Bank of Bengal on 31st December 1849, ..	2,161	7	9			
,, Ditto, in the hands of Government Agent on ditto, ...	270	2	10			
				2,431	10	7
Grand Total, Co.'s Rs.				22,292	11	10

DISBURSEMENTS.

Foreign Vegetable and Flower Seeds.

	Rs.	As.	P.	Rs.	As.	P.
By C. N. Villet, for Cape garden seeds supplied in 1850, ...	1,501	0	0			
,, D. Landreth, for American garden, flower, cotton and maize seeds, supplied in 1849 and 1850, ...	4,261	6	5			
,, C. Lipscombe, for 8 packets of Van Dieman's Land vegetable seeds, supplied in 1850, ...	40	0	0			
				5,802	6	5

LIBRARY.

By Books purchased during the year for the Library, ...	155 4 6	
,, Binding books during the year, ...	6 0 0	
		161 4 6

PRINTING.

Sundry parties, for printing receipts, schedule of prizes for flower shows, &c., ...	... ...	150 12 0

JOURNAL.

Bishop's College Press, for printing part 1 of Vol. 7, ..	664 0 0	
Ditto, for ditto, 25 over copies of *Observations on Himalayan Coniferæ*, for Major Madden, ...	13 1 0	
		677 1 0

NURSERY GARDEN.

Ordinary expences incurred on account of the Nursery Garden, from 1st December 1849 to 30th November 1850, inclusive of sundry additions to Gardener's Bungalow, ...	2,967 3 3	
A supply of grafts of American fruit trees, &c., ...	103 14 9	
		3,071 2 0

ESTABLISHMENT.

Amount for Establishment, from 1st December 1849 to 30th November 1850, ...	... ...	4,576 8 0

PECUNIARY REWARDS.

Prizes to Mallees for vegetables and fruits at the Exhibitions held on the 2nd February and 17th April, ...	359 0 0	
Ditto to ditto for flowers, at the Exhibitions held on the 27th February and 17th April, ...	351 0 0	
Bhauglepore Branch Society, annual donation for 1850, ..	50 0 0	
Delhi ditto ditto for ditto, ...	50 0 0	
		810 0 0

SOCIETY'S VESTED FUND.

The Government Agent, for the purchase of Government Promissory Note for Sa. Rs. 2,000 of the 2nd 5 per cent. loan, ..	... ...	2,166 14 2

METCALFE HALL.

Jessop and Co., advance on account of Society's proportion (Rs. 1,340-9-3) of cost for erecting an iron railing for Metcalfe Hall,	750 0 0	
Burn and Co., being the amount of Society's proportion of cost for erecting a range of out-offices, ...	526 1 6	
Ditto Society's proportion of quarterly allowance to them for inspecting the Metcalfe Hall from August 1849 to November 1850, ...	75 0 0	
Sundry parties for various articles of furniture for the Hall, &c. including a large record almirah, ...	105 15 0	
		1,457 0 6

ADVERTISEMENTS.						
By Advertising in the public prints, notices of general meetings, of shows of vegetables and flowers, distribution of seeds, &c. &c. (including the sum of Rs. 323-9-6 remitted to Messrs. Grindlay to meet the cost of advertising in the English and Continental Journals the prize of 5,000 Rs. for a cotton-cleaning machine,)				747	7	6
STATIONERY.						
,, Stationery for office books, and for the use of the office, ..	67	13	0			
,, Ditto, 9 reams of brown packing papers for packing seeds, ..	64	8	0			
				132	5	0
FREIGHT.						
,, Freight on boxes of seeds, books, &c. sent and received from Cape, England, America, &c., ...	323	9	9			
POSTAGE AND SUNDRY OTHER CHARGES.						
,, Postage on letters, &c. sent and received, and on copies of the Journal and for petty expences, ...	426	14	0			
,, Extra Packermen for subdividing seeds, ...	13	5	0			
,, Extra Writer, for writing on papers of ditto, ...	4	0	0			
,, Tinman for soldering tin boxes for ditto, ...	16	6	9			
,, Messrs. Grindlay and Co., in payment of sundry expences incurred by them, also subscription for 1849 to their Agency, ..	28	8	3			
,, Saumtoollah Peon, being the amount lost by him when collecting subscriptions, (and to repay which he is under stoppages),	20	0	0			
,, Balance of expences incurred for cleaning and packing seed cotton for shipment to Grindlay and Co., for the use of competitors for the prize offered for an improved cotton-cleaning machine, ...	23	0	0			
,, For expences incurred in putting up a fence round a portion of the Auckland Circus, for superintending the erection of tents, for refreshment for band, &c. for flower and vegetable shows during the year, &c., ...	275	10	6			
,, Presents to Constables for attending at Horticultural and Floricultural Exhibitions during the year, ...	52	0	0			
,, Mrs. D'Cruz, for her pension for 10 months, at 30 Rs. per month,	300	0	0			
,, Government Agents' commission, brokerage, &c. charges during the year, ...	14	9	8			
				1,174	6	2
Total Disbursements, Co.'s Rs.				21,250	13	0
Balance in the Bank of Bengal on 31st December 1850, ..	219	5	10			
Ditto in the hands of Government Agent ditto, ...	811	3	0			
Ditto in the hands of Treasurer ditto, ...	11	6	0			
				1,041	14	10
Grand Total, Co.'s Rs.				22,292	11	10

MEMORANDUM.

Disbursements.

		Rs.	a.	p.	Rs.	a.	p.
To Amount of Disbursements during the year 1850, as per statement,	... ...				... 21,250	13	0
,, Balance in the Bank of Bengal on 31st December, 1850. ...	... ...	219	5	10			
,, Ditto in the hands of the Government Agent on ditto, ...	... ...	811	3	0			
,, Ditto in the hands of Treasurer on ditto,	...	11	6	0			
					1,041	14	10
Total, Co.'s Rs.	...				... 22,292	11	10

Receipts.

		Rs.	a.	p.	Rs.	a.	p.
By amount of Receipts during the year 1850, as per Statement,	... ...				... 19,861	1	3
,, Balance in the Bank of Bengal on 31st December, 1849, ...	... ...	2,161	7	9			
,, Ditto in the hands of Government Agent on ditto,	... ...	270	2	10			
					2,431	10	7
Total Co.'s Rs.	... ...				... 22,292	11	10

Liabilities.

Amount due by the Society for English flower seeds supplied in 1850, ...	... £ 163	5	0
Ditto for periodicals supplied by Messrs. Smith, Elder and Co., ...	... ,, 5	12	4
Ditto to Messrs. Peter Lawson and Co., for a trial assortment of vegetable seeds, supplied in 1850, ...	... ,, 3	12	6
	£ 172	9	10
Ditto to Messrs. Jessop and Co., balance of their bill for an iron railing.	Rupees, 590	9	3

Dependencies.

Amount invested in Government Securities lodged in the Government Agency office, ...	... 22,366	10	8
Amount of subscription in arrear, ...	... 6,462	12	9

CODE OF BYE-LAWS

FOR THE

AGRICULTURAL AND HORTICULTURAL SOCIETY OF INDIA.

CONTENTS.

BYE-LAWS.

CHAPTER I.

Object.

The promotion and improvement of the Agriculture and Horticulture of India, constitute the object of the Society.

CHAPTER II.

Constitution.

The Society consist of Members, Honorary and Corresponding Members, and Associates.

CHAPTER III.

Proposal and Election of Members.

Section 1.—Persons of every nation shall be eligible as Members of the Society.

Section 2.—Candidates for admission as Ordinary Members shall be proposed by two Members at a General Meeting, and ballotted for at the succeeding Meeting, when a majority of votes shall determine the election.

Section 3.—Persons so elected shall have immediate notice thereof transmitted to them by the Secretary, accompanied by a copy of the Bye-Laws.

Section 4.—Ordinary Members shall pay an admission fee of 8 Rs., and the same sum quarterly, in advance, (commencing from the quarter of the year in which they are elected,) so long as they continue resident in India. It shall be optional for any Member to compound for the quarterly contributions by the payment of Rs. 400 to the funds of the Society.

Section 5.—The payment of the admission fee shall be considered as distinctly implying the acquiescence of every Member elected into the Society in all the Rules, Regulations, and Bye-Laws thereof. A Member retiring from the Society shall be exempted from the payment of a second admission fee on re-election.

Section 6.—Members whose absence from India shall not extend beyond four years, shall continue to be borne on the list of Members, but shall be exempt from the payment of subscriptions, until their return to the country.

Section 7.—When any Member shall be in arrear of his annual contribution for one year, he shall be apprised by letter, addressed to his last known place of residence, that unless the amount due by him be paid within six months of the date of notice, his name shall be removed from the list of Members, and in the event of his omitting to pay the amount within the time limited, his name shall be removed accordingly, and published in the proceedings of the Society as a Defaulter.

Section 8.—Ladies may be admitted as Members upon the same terms, and under the same regulations in all respects, as Gentlemen.

CHAPTER IV.

Withdrawal of Members.

Section 1.—Any Member may withdraw from the Society by intimating his wish to do so by letter addressed to the Secretary, without continuing his subscription beyond the quarter of the year in which his resignation is sent in; subject nevertheless to his name being published among the Defaulters (as per section 7 of chapter iii.) if his arrears of subscriptions are not paid.

Section 2.—A resigning Member shall be at liberty to withdraw his letter of resignation, on payment of arrears, without going through the form of re-election; provided such notice of withdrawal be given during the year in which the resignation has been notified.

CHAPTER V.

Privileges of Members.

Section 1.—The Members have the right to be present and to vote at all General Meetings; to propose Candidates for admission into the Society as Members, as also to have personal access to the Museum, Library, and Garden of the Society, and to. introduce visitors at the Ordinary Meetings.

Section 2.—Members shall be entitled to a share of all seeds purchased by, or presented to the Society; they can indent, at least once

a year, on the Society's Garden for plants; they shall also be entitled to a copy of the Society's Journal, published subsequently to their election, and to previously published volumes on payment of the cost charges.

Section 3.—Members in the country applying for seeds shall distinctly state to whose care such seeds are to be delivered in Calcutta or how otherwise they are to be forwarded: the Society cannot despatch them at its own expense.

Section 4.—Only Members actually resident in India shall have claims upon the Society's Garden, or seeds imported by the Society, or copies of the Journal, unless they continue their subscriptions while abroad.

Section 5.—Members resident in Calcutta and its suburbs, whose subscriptions are three quarters in arrear, shall be debarred from all the privileges above mentioned. The same rule is applicable to Members in the country, who are four quarters in arrear.

CHAPTER VI.

Of Honorary Members.

Section 1.—Honorary Members shall be persons eminent for their knowledge of, or encouragement given to Agriculture or Horticulture, or for services rendered to the Society.

Section 2.—Persons proposed as Honorary Members shall be recommended by the Council, they shall be ballotted for like Ordinary Members, but three-fourths of the votes shall be required to determine their election.

Section 3.—Honorary Members shall be exempted from the payment of fees and contributions; and they shall be entitled to all the privileges of Ordinary Members.

Section 4.—No Office-Bearer of the Society shall, in future, be eligible as an Honorary Member during his tenure of office.

CHAPTER VII.

Of Corresponding Members.

Section 1.—The Corresponding Members of the Society shall be constituted of such persons not resident in Calcutta, or within one hundred miles thereof, as may show a willingness to promote the objects of the Society.

Section 2.—Corresponding Members shall not be limited as to numbers; they shall have the privilege of attending the Meetings of the Society, but shall have no voice in the business; they shall receive such copies of the Society's Journal as may contain their contributions, but shall not be entitled to receive seeds, plants, &c.

Section 3.—Persons proposed as Corresponding Members shall be recommended by the Council, they shall be ballotted for like Ordinary Members, but three-fourths of the votes shall be required to determine their election.

CHAPTER VIII.

Of Associates.

Section 1.—Associates shall be persons well known for their practical knowledge of, or encouragement given to Agriculture or Horticulture, or for services rendered to the Society, but who are not likely to apply to become Ordinary Members.

Section 2.—Persons proposed as Associates shall be recommended by the Council, they shall be ballotted for like Ordinary Members, but three-fourths of the votes shall be required to determine their election.

Section 3.—Associates shall be exempted from the payment of fees and contributions: they shall have all the privileges of Ordinary Members, except that of voting at Meetings of the Society.

CHAPTER IX.

General Meetings.

Section 1.—The General Meetings to be held by the Society shall be of three kinds: 1st, Annual—2nd, Ordinary—3rd, Special.

CHAPTER X.

Anniversary General Meeting, Election of Officers, Council, and Committees, Annual Report.

Section 1.—An Anniversary General Meeting shall be held in January of each year, for the election of Officers and Council for the ensuing year, for the nomination of the several Standing Committees, and to receive and hear read the Annual Report on the financial and general concerns of the Society.

Section 2.—The Officers shall consist of—

1 President.
4 Vice-Presidents.
(Two of whom shall always be natives.)
1 Secretary.
1 Deputy-Secretary and Treasurer.

Section 3.—The President and Council shall, previous to the Meeting, nominate the persons whom they recommend for election as Office Bearers and Council; and ballotting lists containing the names of the Members recommended, leaving a blank column opposite for such alterations as Members may wish to make, shall be prepared one week before the day of election. A copy of the list shall be handed to each Member present at the Meeting, and should he disapprove of any name or names, or be desirous of inserting some other name or names, he shall erase or insert accordingly.

Section 4.—The Chairman shall appoint two Scrutineers, not Members of the Council, to examine the lists and report the result to the Meeting.

Section 5.—In the event of a vacancy during the year in the list of Officers or Council of the Society, such vacancy shall be filled up for the remainder of the year on the recommendation of the Council, at the second Monthly Meeting after the occurrence of such vacancy.

Section 6.—With the exception of the President, Secretaries and Treasurer, the Office Bearers of the Society after a tenure of office during two years, shall not be eligible for re-election till the expiry of twelve months.

Section 7.—The revision of the various Standing Committees shall also take place at each Anniversary Meeting, consisting of the following:

Sugar Committee.
Cotton Committee.
Silk, Hemp, and Flax Committee.
Coffee and Tobacco Committee.
Oil and Oil Seed Committee.
Grain Committee.
Implements of Husbandry and Machinery Committee.

Nursery Garden Committee.
Fruit and Kitchen Garden Committee.
Floricultural Committee.
Translation Committee.

Section 8.—The Council shall consist of the Office-Bearers and twelve Members.

Section 9.—No person shall hold at the same time more than one of the following offices: viz. President, Vice-President, or Secretary.

Section 10.—The Council shall elect from their own body, Sub-Committees of Finance and Papers, whose reports on all matters referred to them shall be submitted to the Council.

CHAPTER XI.

Ordinary and Special General Meetings.

Section 1.—Ordinary General Meetings shall be held at the Society's apartments, Metcalfe Hall, on the second Saturday of every month throughout the year, at half-past nine A.M. and half-past four P.M. alternately.

Section 2.—Strangers may be present at the Ordinary General Meetings, if introduced by Members, and their names given to the President for record.

Section 3.—The ordinary course of procedure at the General Meetings, shall be as follows:

1. The proceedings of the preceding General Meeting shall be read and submitted for confirmation.
2. The names of the gentlemen proposed as Members at the last Meeting shall be announced for ballot.
3. Motions of which notice was given at the last Meeting shall be brought forward and disposed of.
4. Notice of motions shall be given for entry in the proceedings of the Meeting.
5. The names of gentlemen proposed as Members, shall be announced.
6. The various reports, &c. on questions referred to the Council, shall be submitted for consideration.

7. Papers and communications, received since the last meeting, together with their respective presentations, shall be brought to notice.

Section 4.—Special General Meetings may be convened at any time, on a requisition to that effect to the President, signed by at least six Members, who thereupon will call the same, through the Secretary, or Deputy-Secretary, by public advertisement in three of the newspapers of the presidency. No Special Meeting shall take place without a month's previous notice being given, unless the case be urgent.

Section 5.—No stranger shall be permitted to be present at Special Meetings of the Society.

Section 6.—Notice of motion on questions of Finance, or other matters of importance, shall be given at a General Meeting, preceding that on which the subject is to be disposed of, in order that Members who take an interest in the question may have an opportunity of expressing their assent or dissent; and no motion of which notice has not been given, shall be carried at the Meeting at which it is proposed, if any three Members present vote for its postponement.

Section 7.—Motions of which previous notice has been given shall take precedence of all others.

Section 8.—Mofussil Members shall have the privilege of voting on questions of which one month's notice is given, sending their votes, post paid, to the Secretary, for record.

CHAPTER XII.

Council,—Powers and Duties.

Section 1.—The government of the Society and the management of its concerns are entrusted to the Council, subject to no other restrictions than are imposed by the Bye-Laws, and to no other interference than may arise from the decisions of the Members assembled in General Meetings.

Section 2.—The Council shall meet once at least in every calendar month throughout the year, on such day or days as they shall deem expedient.

Section 3.—No Meeting of the Council shall be competent to enter on, or decide any business, unless three or more Members be present.

Section 4.—The Council may appoint persons, not Members of it, to be salaried Clerks or Servants, for carrying on the necessary concerns of the Society, and may define the duties to be performed by them respectively, and may suspend any Clerk or Servant from office whenever it shall appear to them necessary: provided always, that such appointment or suspension shall be reported to the next General Meeting of the Members, to be confirmed or annulled as may be decided by such Meeting.

Section 5.—The Council shall present and cause to be read to the Anniversary General Meeting, a Report on the general concerns of the Society for the preceding year. The Report shall state the income and expenditure, the receipts and disbursements, and the increase or decrease of the Society during that year: and give an estimate in detail of the probable income and expenditure of the succeeding year.

Section 6.—The Council shall distribute seeds and plants to all public gardens, reporting their proceedings to the next Meeting of the Society. No other resolution of the Council for disposing of or pledging the funds or property of the Society to any amount beyond the current expences of the establishment shall be acted upon or be of any validity, until confirmed by the Society.

Section 7.—The President, or in his absence one of the Vice-Presidents, or in their absence the senior Member, shall preside at every Meeting of the Council.

Section 8.—All questions shall be decided by ballot, on the demand of any Member present; and the decision of the majority shall be considered the decision of the Meeting.

CHAPTER XIII.

The Duties of the President and Vice-Presidents.

Section 1.—The business of the President shall be to preside at all the Meetings of the Society, and regulate all the proceedings therein: and generally to execute, or see to the execution of the Bye-Laws and orders of the Society.

Section 2.—In case of the absence of the President from any of the Meetings, his place shall be filled by the senior Vice-President then present, and in the absence of the Vice-Presidents, by the senior Member present, who shall, for the time being, have all the authority, privilege, and power of the President.

CHAPTER XIV.

Of the Secretary and Deputy-Secretary.

Section 1.—The Secretary, or in his absence the Deputy-Secretary,* shall exercise a general inspection over the servants and the affairs of the Society, and shall see that the Bye-Laws and orders of the Society are executed: he shall also attend the Meetings of the Society, and read such papers as may be submitted.

Section 2.—The Secretary, or in his absence the Deputy-Secretary, shall sign all letters and papers emanating from the Society.

Section 3.—The Deputy-Secretary shall draw up the correspondence of the Society, and be in daily attendance at the Society's apartments during the usual office hours.

CHAPTER XV.

Of the Treasurer and the Accounts.

Section 1.—The Treasurer shall demand and receive for the use of the Society, all moneys due by or payable to the Society, and shall keep full and particular accounts of all sums so received and paid.

Section 2.—The moneys as received shall be deposited in the Bank of Bengal; and when the surplus shall exceed Rupees 1,000 it shall be invested in Company's Securities, on behalf of the Society, in the name of the Government Agent for the time being.

CHAPTER XVI.

Of Committees.

Section 1.—Besides the Standing Committees (section 7, chapter x.) the Members assembled in General Meeting may appoint Committees to report on any special matter, relating to the objects or concerns of the Society.

* There is no Deputy-Secretary now.

Section 2.—Every Committee shall cause minutes to be taken of its proceedings.

Section 3.—Every Committee may appoint its own Chairman and Secretary.

Section 4.—Any Member of any Committee, who shall be personally interested in any question before that Committee, shall withdraw during the consideration of, and vote upon, the same, and shall not take part in any Report that may be drawn up upon the matter for submission to the Society.

Section 5.—The Secretary shall be, *ex-officio*, a Member of all Committees.

CHAPTER XVII.

Of the Publications of the Society.

Section 1.—The Journal, or other publications of the Society, shall be under the superintendence of the Council, and shall be printed from time to time, whenever a sufficient number of such papers as may be deemed of public utility have been collected to form part of a volume.

Section 2.—Contributors to the Journal, &c. shall be entitled to twenty-five copies of their papers.

CHAPTER XVIII.

Distribution of Prizes.

Section 1.—The distribution of Prizes at the Periodical Vegetable and Flower Shows of the Society shall be undertaken by the President or senior Vice-President. In the absence of such Officer or Officers, the senior Member of the Committee, to whom the arrangements of the show are entrusted, shall perform that duty.

Section 2.—The Council shall have the power of adopting from time to time any regulations for the management of the shows that may seem to them expedient.

CHAPTER XIX.

Amendments of the Bye-Laws.

Amendments or alterations of the Bye-Laws may be proposed at any Ordinary Meeting of the Society: they shall, with the assent

of the majority of the Members present, be entered on the minutes, and if ordered by the said majority to lie over for consideration, the President shall direct them to be read by the Secretary, and stated for discussion at the next General Meeting; and if three-fourths of the Members, provided that not less than eleven Members be present, shall vote in favour of adopting them, they shall be recorded as a part of the Bye-Laws.

Printed by J. Baptist, Bishop's College Press.